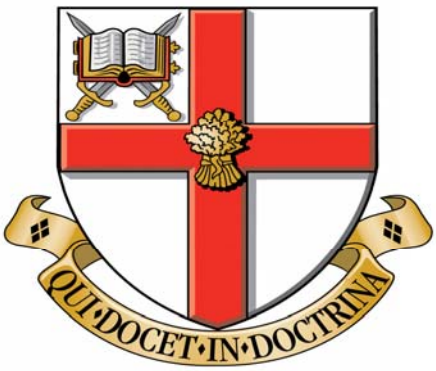

University of Chester

EFFECTIVE HORSE BEHAVIOUR CONSULTANCY: AN EXPLORATION BY MEANS OF A SOCIAL COGNITION APPROACH

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Master in Philosophy

By

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ABSTRACT

Behaviour problems are common in domestic horses. It is suggested that the aetiology of these problems may lie in a lack of understanding of horse ethology, in particular learning theory. Horse behaviour consultants offer a vehicle for educating owners and promoting a thorough understanding of these principles which, in turn, will help to resolve behaviour problems and minimise the associated welfare concerns. Where the services provided by horse behaviour consultants are effective they are likely to be promoted. An effective service is dependent on the client's adherence to the advice given and, therefore, this research aimed to establish recommendations to horse behaviour consultants on how to foster adherence to their advice.

The established science of human behavioural change has largely been applied in the field of health psychology to indentify predictors of adaptive behaviour. A thorough review of human behavioural change literature identified ten cognitive variables that had the potential to predict adherence to the advice of a horse behaviour consultant. Established self-report questionnaire methodology was adopted to survey an opportunistic sample of 52 clients of horse behaviour consultants before they received the advice (initial cognitive profile), ten days after (changes post-communication) and at three months follow-up (long-term changes). The self-reported responses were validated by telephone. Data were preliminarily analysed using correlation analyses and subsequently multiple regression analyses were used to generate a model for adherence.

Of the client's initial cognitive profile, less attribution of the horse's behaviour problem to external factors ($r = -0.316$) was associated with increased adherence ten days after the communication. Horse behaviour consultants cannot influence what clients come into the process perceiving, however, they are able to influence cognitive variables during the communication. The amount of post-communication change in *value of the outcome of adhering to the advice* (beta = 0.338) and *attribution of the horse's behaviour problem to external factors* (beta = 0.309) were significant elements of a multiple regression analysis that explained 23.6% of the variance in adherence ten days after the communication ($F_{2,35}= 6.700$, $p = 0.003$). At three months follow-up there were no associations between adherence and the earlier cognitive profiles, but clients who showed a three month increase in positive attitude towards horse behaviour consultants were more likely to adhere long term ($r = 0.389$).

The findings suggest that horse behaviour consultants will benefit clients by demonstrating the effects of the advice early in the communication, so that clients value their efforts to adhere and continue to do so. Horse behaviour consultants may also foster adherence to their advice by developing the client's perception of an external, controllable cause of their horse's behavioural problem, which may build confidence in the client's ability to address the problem.

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LIST OF ABBRIVIATIONS

APBC	Association of Pet Behaviour Counsellors
ASAB	Association for the Study of Animal Behaviour
BETA	British Equestrian Trade Association
BPS	British Psychological Society
HBM	Health Belief Model
MHLC	Multi-dimensional Health Locus of Control
PMT	Protection Motivation Theory
SCT	Social Cognitive Theory
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
URICA	University of Rhode Island Change Assessment Scale

CHAPTER 1

Introduction

The desire to develop a partnership that performs exceptionally well is a recurring theme of horse ownership (Birke & Brandt, 2009; Keaveny's, 2008). Such a partnership is developed through effective cooperation between horse and rider and aids performance at all levels of equitation (Auty, 2001). A harmonious relationship may also have a pragmatic subtext due to the risk of injuring one's self when riding and handling horses. Due to the number of unreported cases there is no data quantifying the exact number of horse related injuries in the UK. However, Hausberger et al (2008) reported approximately 2,300 hospital admissions each year due to riding accidents in the US, highlighting the potential level of risk involved in horse ownership. The relationship between horse and rider is a major factor when assessing the rider's risk of injury (Hausberger et al, 2008), demonstrating the importance of the quality of the human-horse relationship.

Relationships are based on a series of interactions and are judged by the occurrence of those that are pleasant (appetitive) and unpleasant (aversive) (Hausberger et al, 2008). One would expect that where interactions are perceived as mostly aversive the relationship will also be perceived as aversive. Owners may perceive their relationship with their horse to be this way if they encounter problem behaviours during interactions. Mills (1999) argues that it is the owner's perception of behaviour that determines whether it is a problem or not. From this one could argue that those behaviours that are perceived to cause a barrier to the owner achieving what they intend to do with their horse, or put the owner at risk of injury, may be viewed as problem behaviours.

A large-scale survey of horse owners revealed common behaviour problems in ridden horses (Hockenhull & Creighton, 2009a). The problem behaviours that were reported included shying, moving off when the rider mounts, bucking, issues with jumping and resistance to the rider's aids. Such

behaviours may prevent the rider from achieving their intended goal and influence the horse-owner relationship. Where the horse persistently performs such behaviours, the rider may experience a lack of control over interactions with their horse, which they are likely to perceive as stressful (Amirkhan, 1990).

In some contexts, where a horse causes its owner to experience stress it may not fulfil its role as a leisure animal. With regard to professional riders, if problem behaviours are preventing the achievement of ambitions one must consider whether the horse is fulfilling its role. In both cases, the large cost of keeping a horse would lead one to question whether the animal is economically viable. The majority of horses are used in sporting or leisure roles (British Equestrian Trade Association, 2006), so are expected to fulfil a role that would be threatened by the performance of problem behaviours. There is evidence to suggest that a large proportion of horses (48%) are euthanised with no reason declared (Odberg & Bouissou, 1999). It has been suggested that this wastage may be due to behavioural problems that render the horse unfit for purpose (McGreevy & McLean, 2005; Odberg & Bouissou, 1999). If euthanasia is a common approach to dealing with horses that are not providing the expected return for the cost of keeping them, this highlights behaviour problems as a concern for horse welfare and thus the need to minimise them.

In the Hockenhull and Creighton (2009b) survey 82% of horse owners reported the occurrence of behaviours that are reported as problematic in scientific literature, equestrian magazines and forums. This provides some indication of the number of horses whose welfare, and handlers whose well-being, are potentially compromised by behaviour problems. Hockenhull and Creighton (2008a) also revealed that risk factors associated with behavioural problems in leisure horses included owner experience. Similarly, in their study of dog ownership and canine behaviour problems, Jagoe and Serpell (1996) demonstrated a large frequency of behaviour problems in dogs that belonged to first-time owners. They suggest that the cause may have been due to a lack of experience in communicating with dogs, or a lack of

knowledge causing the owner to select an inappropriate breed. As new owners from outside the traditional horse owning section of the population take up the sport the demographics of horse riders and owners are becoming increasingly diverse (BETA, 2006). The high incidence of problem behaviours reported by Hockenhull and Creighton (2009b) may, to some extent, be due to the increasing number of horses whose welfare may be compromised by the inexperience of their owners.

Despite the recurring desire for a harmonious human-horse relationship, there is evidence to suggest that behaviour problems, which indicate the lack of such a relationship, are widespread. This raises concerns for the welfare of the horses and well-being of the horse owner or rider. In this instance, there is a need to ensure that horse owners are aware of how to prevent, or correctly address problem behaviours, so that these concerns are minimised.

1.1 The aetiology of behavioural problems and associated welfare concerns

1.1.1 The role of training in the aetiology of behaviour problems

The behaviour problems that cause most threat to the human-horse relationship are those that interfere with what the owner wants from the horse. All horse owners need to handle their animals and a large proportion of owners ride their horses (BETA, 2006). In order to handle or ride a horse it must be trained to allow the handler or rider to do so. An increased understanding of horse learning processes has prompted scientists to critique traditional and contemporary ways of training horses (Goodwin, 2007; McLean & McGreevy, 2004; McGreevy, 2007; McGreevy & McLean, 2007; Warren & Casey, 2005; Warren et al, 2002). In particular, McClean and McGreevy (McLean & McGreevy, 2004; McGreevy, 2007; McGreevy & McLean, 2007) suggest that the most significant problem in current horsemanship is the misapplication of training aids and that this causes the majority of ridden or handling behaviour problems.

Operant conditioning (building an association between a response and reinforcer; Domjan, 2003) is the learning mechanism most commonly exploited to train horses (McGreevy, 2007). Negative reinforcement involves the removal of an aversive stimulus to reinforce a desired behaviour (Domjan, 2003, pp135). This principle is applied in ridden horsemanship and is referred to as application of the 'aids'. An aid is a specific aversive stimulus assigned to elicit a specific response and consists of applying physical pressure on the horse's barrel with the rider's leg, or pressure on the horse's mouth through the reins with the rider's hands (McLean & McGreevy, 2004).

When an aid (aversive stimulus) given by the rider is not removed when the desired response is offered by the horse, the horse is not reinforced for the response and it will cease to offer the behaviour in response to the aid in the future (extinction; Domjan, 2003, pp115). When this occurs horses are described as 'dead to the leg' or deemed unresponsive to the bit, which may be perceived as problem behaviours. Such non-responsiveness can encourage riders to resort to stronger aids or gadgets (such as a bit that applies a larger amount of pressure on the horse's mouth), some of which can cause considerable physical discomfort (McLean & McGreevy, 2004).

Another problem common in horsemanship is the use of two aids at the same time. McLean and McGreevy (2004) use the example of tight pressure on the reins (stop aid) applied at the same time as strong pressure from the legs (go aid). When this situation arises, the horse finds itself in a conflict of responses (McClean & McGreevy, 2004) and when an animal tries to resolve two opposing drives conflict behaviours arise. In the horse, extreme conflict behaviours may include bucking, rearing, shying or resistance to slow or move forward (McClean & McGreevy, 2004). Such behaviours may interfere with what the rider wishes to do with their horse and or put the rider at risk of falling from the horse thus compromising their safety. The horse may not immediately resort to the performance of such exaggerated conflict behaviours, instead where conflict situations are frequent such horses may feel increasingly tense and a frustrated desire to flee (McClean & McGreevy,

2007). In this circumstance, one would assume that the horse may experience prolonged stress.

Another situation that has the potential to cause conflict in the horse is inaccurate or inconsistent use of aids (McGreevy, 2004a). When the horse has learnt the required response to an aid (the response that ceases the aversive stimulus), should that response then fail to remove the physical pressure of the aid, the horse may become conflicted between the drive to continue giving that response and the more instinctive drive to escape the pressure. Similarly, when a rider's aid is inaccurate or unrecognisable to the horse, it may not know what behaviour to offer to cease the pressure and may resort to performing problem conflict behaviours.

Conflict situations may also arise when the horse is asked to over-ride its instinctive responses. The horse may find itself conflicted between the drive to comply with the rider's aids and the natural drive to avoid a threatening obstacle (e.g. a jump fence). The horse may resort to stopping, running out of the jump or rushing at it to resolve the conflict (McClean & McGreevy, 2004).

The points made above illustrate that where conflict arises in the horse there are a range of behaviours that the horse may display. Which behaviour is performed is possibly dependent on the horse's temperament, the extent of the rider's persistence with the aid and the amount of physical discomfort caused by the aid (McClean & McGreevy, 2004).

The processes of operant conditioning are not exclusive from one another and negative reinforcement and positive punishment (the application of an aversive stimuli to reduce the occurrence of a behaviour; Domjan, 2003, pp134) occur within the same process. For example, pressure on the horse's mouth through the reins and bit is the aid to slow (Auty, 2001). The initial pressure is punishment as it applies an aversive stimulus that causes the horse to stop their current behaviour of moving forward, once the horse is moving at a slower pace the pressure is removed and this behaviour is

reinforced by the removal of the aversive stimulus (negative reinforcement; Domjan, 2003). Used in this way, punishment is integral to the training aids, however, punishment is also commonly applied to stop behaviour that has resulted from a conflict situation, for example use of the stick when the horse performs an unwanted behaviour such as bucking (McGreevy, 2004b).

Theoretically, punishment should cause the immediate cessation of the unwanted behaviour (Domjan, 2003, pp134). Yet, it is only effective if administered within close temporal proximity to the unwanted behaviour, occurs after every incidence of the behaviour and it is of an appropriately large magnitude (Domjan, 2003, pp304-305). When not correctly applied the use of punishment can lead to further problems.

The punishment needs to be large enough to outweigh the benefit that an animal perceives it will gain from performing the unwanted behaviour (Domjan, 2003, pp302-304). Where the behaviour is particularly exaggerated (e.g. a large buck) one would assume that the horse is highly motivated to perform it. To cause this behaviour to cease, the punishment must outweigh the benefit and where the punishment is of an appropriate magnitude, it may cause actual harm to the horse, thus raising a welfare concern. One would hope that there are few owners that would purposefully cause extreme physical harm to their horse and, therefore, a more pressing concern is the common administration of punishments (McGreevy, 2004b) that may not be of an appropriate magnitude. If the punishment is not large enough to outweigh the perceived benefit of performing the behaviour, the behaviour may be repeated (Domjan, 2003, pp304) and, in the context of horsemanship, the rider may in turn repeat the punishment. Where punishments of a low magnitude are repeated the animal may become habituated to it (Domjan, 2003, pp304) and the rider may not gain the intended outcome.

Secondly, if punishment is not administered with appropriate timing, the horse may not form an association with the intended behaviour (Nicol, 2005) and may form an association with something else, unintended by the rider. If

the horse cannot avoid punishment by ceasing the behaviour the rider wishes to stop, it may experience a lack of control over its environment and where animals cannot gain control over their environment they experience stress (Broom, 1991).

Thirdly, the rider may fail to punish the horse after every occurrence of the unwanted behaviour. This may result in the horse failing to build an association between the behaviour and the punishment (McGreevy, 2004b) and, therefore, also subject it to the welfare concerns raised above.

A further scenario may be that the horse increases the magnitude of the behaviour in response to the punishment as a further conflict behaviour (e.g. increase the power and size of the buck; McGreevy, 2004b). If the rider, possibly due to fear, stops administering the punishment the cessation will negatively reinforce the larger behaviour (Domjan, 2003, pp135), which may then be performed in response to subsequent applications of the punishment. This scenario may result in problem behaviours that cause severe disruption to achieving the rider's goals, or severe risk of injury.

Finally, if punishment is administered often by a rider, the horse may associate that rider with punishment (McGreevy, 2004b). Learning may be inhibited as the horse refrains from offering any responses to the aids in order to avoid punishment. The rider may view this as a problem behaviour, which may elicit yet harsher aids.

In conclusion, where training aids are not applied with accuracy, miscommunications may occur that may result in the performance of problem behaviours, which in turn may compromise horse welfare and rider safety.

1.1.2 The role of management in the aetiology of behaviour problems

Evidence suggests that there is a high incidence (approximately 50%) of stereotypic behaviour (e.g. wind sucking, weaving and box walking) in

domestic horses in the UK (Hockenhull & Creighton, 2009b). The performance of stereotypic behaviour has been linked with the intensive management of horses (e.g. Parker, Goodwin & Redhead, 2008), specifically in relation to feeding (Hothersall & Nicol, 2009) and restricted social contact (Cooper, McDonald & Mills, 2000). Stereotypic behaviours are thought to represent a behavioural adaptation to enable the animal to cope with a suboptimal environment (Cooper & Albentosa, 2005) and, therefore, are indicators of poor welfare. Furthermore, they may be viewed as problem behaviours in themselves, as they are associated with physical problems (Cooper & Albentosa, 2005) and considered unsightly and may reduce the value of a horse (Auty, 1998).

The presence of stereotypic behaviour in horses has been linked with slower learning ability (Hausberger et al, 2007), which Hausberger et al (2007) suggest is possibly caused by their tendency to focus on the stereotypie and pay less attention to the learning task, or by the release of opiates when the horse performs the stereotypic behaviour. Stereotypic horses may, therefore, be more vulnerable to conflict situations or abuse from punishment than those without stereotypies if their slow learning ability is not accounted for in training and their value is perceived to be low.

Evidence suggests that stabled horses take longer to complete basic training and longer to habituate to the training environment (River et al, 2002). Additionally, singularly housed horses perform less well in behavioural tests and training than those housed in groups (Sondergaard & Ladewig, 2004). It is possible that stabling horses, and in particular singularly housing horses, makes it more difficult for them to perform training and, therefore, to perform the role that the rider requires of them. This may be particularly applicable to competition horses that are required to habituate to challenging environments (e.g. large competitions where there may be many novel objects) and learn precise responses to intricate aids to allow them to perform at the highest levels, but are often stabled in order to maintain a large degree of control over their diet and avoid injury (Auty, 1998).

River et al (2002) also found that stabled horses were more active when ridden than horses kept at pasture and performed more problem behaviours such as bucking and jumping. In their natural environment horses roam large distances while grazing (Boyd & Keiper, 2005) and River at al (2008) propose that because the stable physically restricts movement, the stabled horse is left with a frustrated desire to travel and unspent energy. They argue that this that is responsible for the increased activity levels and unwanted behaviours. Hence, stabling horses may predispose them to performing problem behaviours.

Finally, horses are often ridden without the presence of another horse. As they are social animals (Boyd & Keiper, 2005) this may induce anxiety and napping behaviour (McLean & McGreevy, 2004) which may be perceived as problem behaviour. This again highlights the potential for common management practices to predispose the horse to behavioural problems.

In conclusion, management practices that are not compatible with the horse's natural lifestyle may result in the development of stereotypies and problem behaviours that interfere with the human-horse relationship.

To summarise the section, the presence of behaviour problems within the human-horse relationship has welfare implications for the horse, as ultimately it is the owner who decides how the problem is dealt with. This may involve administrating punishment or, in extreme cases, euthanasia. However, poor welfare can also be the cause of behaviour problems, as in the case of management practices affecting behaviour. The high prevalence of behaviour problems found in horses highlights that there is a pressing need to identify and reduce their cause by resolving the welfare issues associated with such behaviour. The resolution to these problems may involve addressing welfare issues associated with both training and management.

1.2 Resolving behaviour problems

The aetiology of behaviour problems includes insufficient understanding and misapplication of training aids and cues, along with management techniques that may restrict the natural behavioural repertoire of the horse. This suggests that a thorough understanding of learning theory and correct application of its principles in training, along with changes in management towards catering for the horse's behavioural needs requires for the resolution of behaviour problems.

1.2.1 A thorough understanding and correct application of learning theory

Riders and handlers need to be aware of the necessity of removing an aid immediately after the desired response is offered, if the response is to be reinforced (McLean & McGreevy, 2004). This would entail educating riders that the reinforcer of the response is the removal of the aid, but also involves educating the rider about the importance of timing. Should riders be able to exercise appropriate contiguity (Domjan, 2003, pp77) then horses will have less opportunity to habituate to the aids and perform other unwanted behaviours. Similarly, the rider must exercise appropriate contingency (Domjan, 2003, pp77) in the aid if the horse is to build an association between it and the required response. In addition, McGreevy and McLean (2007) suggest that training only one response per aid will help avoid confusion and the horse becoming conflicted between two drives, leading to conflict behaviours. When aids are applied with contiguity, contingency and are unique to each behaviour, it will help create clear communication between horse and rider, making training more effective and behaviour problems less likely. In turn, this may remove the temptation for riders to resort to using stronger aids or gadgets (such as spurs or stronger bits) to gain a reaction, or punishment to stop unwanted behaviours.

Horses are able to transfer their response from an old stimulus onto a new stimulus by forming an association between the two stimuli (classical

conditioning; Domjan, 2003, pp60; McGreevy, 2004b). The horse's ability to be classically conditioned may be purposefully exploited in training, for example to replace crude aids with more refined aids. Initially the aid that results in the horse moving forward may be a kick with both legs; the horse moves forward to escape the aversive stimulus (the kick). Once the horse has learnt that moving forward ceases the kicking, on subsequent occasions the rider may nudge the horse first and only kick should the horse not immediately move forward. If repeated consistently, the horse will form an association between the new stimulus (nudge) and the original stimulus (kick) and in anticipation of the onset of the kick, move forward on the application of a nudge. This may be refined further so that the horse moves forward on the slightest touch from the rider's legs. McGreevy (2007) argues the need for aids to be subtle if ridding and handling are to be humane. The ability to classically condition horses means that riders are able to achieve this if they understand the principles and are able to apply them effectively.

The principles of classical conditioning can also be utilised to train horses to anticipate sequences of movements (McGreevy & McLean, 2007). Aids may be preceded by a slight shift in the rider's weight signalling to the horse that an aid is going to be applied that will require a change in pace, or a new movement to be executed. This pre-aid, often referred to as the 'half-halt' (Auty, 2001), communicates to the horse that it needs to be ready to respond to a new aid.

Where riders are able to master this, it helps to provide clear channels of communication and avoid conflict. Where the horse continues with a tempo or movement without the rider reinforcing it by applying the aid repeatedly, it is said to be in self-carriage (McGreevy & McLean, 2007). Horses that work in self-carriage are given an aid for a movement and continue with that movement until another aid is given asking for a different movement. The half-halt 'pre-aid' can be used to signal to the horse the end of the old movement and to anticipate the onset of the new aid. Self-carriage is a desired element of dressage, but if all riders were taught to encourage it in

their horses they would be able to refrain from over using aids, thus risking the horse habituating to them.

Some trainers advocate the use of positive reinforcement, where the desired response is reinforced with an appetitive stimulus (Domjan, 2003, pp134). This encourages an increased frequency of the desired behaviour (Domjan, 2003, p134). In practical horsemanship, the use of positive reinforcement as a sole training method involves ignoring unwanted behaviours and reinforcing wanted behaviours. Hence, this form of training increases the use of appetitive stimuli and decreases the use of aversive stimuli. For this reason it could be considered a more welfare friendly approach.

Using positive reinforcement has also been found to increase the incidence of explorative behaviours displayed by the horse (Innes & McBride, 2008). This would accelerate training as the horse may be more inclined to try different responses to aids in anticipation of gaining a reward, thus resulting in quicker shaping of the desired response. This, in turn, may reduce the possibility of conflict situations, as the horse may not be inhibited from trying responses for both drives and if conflict situations are reduced, so are the possibility of problem conflict behaviours.

Understanding the specific mechanisms by which horses learn can help riders avoid behaviour problems, as discussed above. To supplement this, knowledge of the horse's general learning abilities may also help to minimise behaviour problems by keeping demands and expectations within what the horse is capable of. As an illustration, horses are able to discriminate between environmental cues to help them accurately predict the occurrence of stimuli. Nicol (2005) uses an example of a horse that may be able to discriminate between practicing to load into a trailer and the event of actually travelling by the absence or presence of a tail bandage. A horse may load perfectly well in practice when no tail bandage is used but refuse to load when travel is intended and a tail bandage is used. In this instance, the horse has associated the tail bandage with the event of actually travelling and has discriminated between this and a practice situation. Should owners

be aware of the horse's ability to do this they may give careful attention to ensuring that there are no stimuli discriminating the two situations.

There has been no conclusive research to suggest that horses are capable of insight learning (McGreevy, 2004b). A rider who anthropomorphically assumes that the horse understands what is being asked on a cognitive level beyond simple stimulus-response association, may drift into giving cues that lack precision (McLean & McGreevy, 2004). There is some suggestion that horses are capable of accelerating their learning by recognising learning sets and the mechanisms involved. For example, once horses have recognised that there is a relationship between the rider's aids and their movements they may pay attention to finer cues (McGreevy, 2004b). To add to this, Creighton (2007) suggests that horses may be capable of higher cognitive abilities than simple stimulus-response associations, but poses the problem that riders rarely develop the skills to utilise it. McLean and McGreevy (2004) suitably summarise the issue by suggesting that where horsemen have a thorough understanding of the horse's learning capabilities cues are more accurate and training becomes more efficient.

From an anthropomorphic perspective, recognising the horse as an animal with species-specific learning abilities and characteristics and refraining from projecting human cognitive characteristics onto it, may prevent handlers from expecting too much from them and creating conflict situations and, therefore, behaviour problems.

1.2.2 A thorough understanding and application of ethology

Modern management practices show few parallels with horse ethology and they may generate behaviours that are perceived as problem behaviours. The occurrence of these unwanted behaviours may outweigh the advantages of management practises such as stabling and restricted forage, that are largely implemented to ease the practicalities of using horses (McGreevy, 2004). If horse owners were to overcome the issues of practicality and

generate an environment that is ethologically relevant to the horse, it may considerably reduce the incidence of problem behaviours.

Understanding the causal attribution of an event enables one to gain a perceived control over the situation (Lyden et al, 2002) which may lessen stress (Amirkhan, 1990). If owners recognise the evolutionary significance of their horse's behaviour it may result in a greater sense of control and minimise the stress that its performance causes, in turn, the behaviour may no longer be considered a problem. To add to this, O'Farrell (1997) found that owner anxiety was positively correlated with the occurrence of displacement behaviour in dogs and the same may be true in horses. Hence, if understanding the behaviour can lesson owner stress and anxiety, this may avoid communicating anxiety to the animal leading to fewer anxiety-related behaviour problems.

Along with utilising learning theory to communicate our requests of them, Kiley-Worthington (1999) argues that owners should also pay attention to the horse's efforts to communicate their needs. She explains that tail swishing and head shaking occur naturally as attempts to remove irritants from the skin, usually flies, but these behaviours also occur out of context when the horse is being ridden. She suggests that these behaviours are signals of annoyance or frustration and that riders should show consideration of this. Kiley-Worthington (1999) proposes that if such cues are understood, the rider may avoid the horse becoming conflicted between the drive to flee from the annoyance and the drive to comply with the rider's aids and minimise the potential for problematic conflict behaviours to arise.

In recent years there has been a movement towards the application of horse social behaviour as a training method (e.g. Parelli, 2009; Roberts, 2009). To illustrate, horses live in groups usually consisting of one stallion, several mares and their immature offspring (Feh, 2005). Within the group there is a social hierarchy and subordinates have been found to follow the movements of the higher ranking animals (Feh, 2005). Natural horsemanship utilises this element of horse ethology by the handler chasing the horse away and then

adopting passive body language to invite the horse back and establish themselves as the lead animal (Parelli, 2009; Roberts, 2009). Natural horsemanship methods have received little scientific attention, but some attempts have been made to establish their efficacy and horses have been shown to follow human handlers after this process (Krueger, 2007; Sighier et al, 2003). It is possible that the act of chasing the horse away is a punishment and rather than establishing the trainer as the lead horse, the horses simply learns to avoid the punishment by following the trainer (Krueger, 2007). Regardless of the ethology mechanising the behaviour, the fact the horse has been shown to follow its handler may have practical application in resolving some behaviour problems experienced by owners when handling their horses from the ground.

Some brands of natural horsemanship also incorporate novel objects into training as a problem solving activity (e.g. Parelli, 2009). Regular introduction of novel objects may help to prevent situations where the horse is conflicted between the drive to flee novel objects and the drive to respond to the handler's aids. Therefore, this practice may also help to minimise behaviour problems.

In summary, there are simple measures that can be taken to minimise the horse's susceptibility to problem behaviours. Ultimately, this entails an active awareness of horse ethology and, in particular, learning theory. An appreciation of horse ethology may alter the owner's perception of which behaviours are problematic and so aid the harmony of the human-horse relationship. Where owners make changes in management and apply learning theory appropriately there is potential to reduce the presence of behaviour problems, improve horse welfare and improve the well-being of the rider.

1.3 Sources of advice for owners seeking to resolve behaviour problems

The responsibility for initiating changes in horsemanship towards effective knowledge and use of ethology and learning theory has largely fallen upon people working as professional horse behaviour consultants. Behaviour consultant is a broad term and in this context refers to anyone advising on horse behaviour. Such people may include academics, riding instructors, professional trainers and enthusiasts. At present these practitioners are largely self-selected and there is no legal requirement for them to have formal regulation of their skills and experience (Wickens, 2007). Attempts are being made to establish a professional body to over-see standards but this is still in its infancy (Wickens, 2007). The Association of Pet Behaviour Counsellors (APBC) has been active in the last two decades disseminating information and applying guidelines regulating who can become a full member of their association (full members are recognised as having the necessary knowledge, skills and experience to practise pet behaviour counselling; APBC, 2008). It has only been in the last seven years that schemes have been developed to accredit certified behaviourists. The first scheme, established and accredited by the Kennel Club in 2001, concentrates on dogs and uses a points system to establish levels of skill and, therefore, level of accreditation (Wickens, 2007). In the last three years the leading learned body in animal behaviour, the Association for the Study of Animal Behaviour (ASAB), has developed a scheme to certify Clinical Animal Behaviourists (ASAB, 2008). Although developments are ongoing, there are currently few university-validated courses aiming to guide students into this profession.

The APBC and ASAB accredited member lists are dominated by behaviour consultants offering advice, training and consultancy regarding dogs and cats (APBC, 2008; ASAB, 2008). In particular, dog owners appear to have embraced the use of behaviour consultants, with 1717 consultancies for dogs occurring in 2005 (APBC, 2005). A recent study has confirmed that owners who received professional advice on training reported less undesirable

behaviour in their dogs compared with owners who did not receive advice (Gazzano et al, 2008). These are indicators that the behaviour consultancy service available for dog owners is effective.

At the end of 2008, there were four behaviour consultants in the UK registered with the APBC or ASAB Accreditation offering advice on horse behaviour. This number is relatively small in comparison with the 55 registered consultants offering advice on dog or cat behaviour (APBC, 2008; ASAB, 2008). This poses the question of why the service is not flourishing for horse owners. Unlike horses, dogs reside in the family home and the close proximity of dogs with their owners may mean that problem behaviours are more easily noticed as they interfere more with everyday life. However, severe horse behaviour problems can result in human and horse fatalities, which may suggest that help would be sought. Research suggests that members of the Australian Pony Club preferentially seek advice from peers rather than from qualified clinicians (Buckley et al, 2004), a finding supported by McCall (2007) who reports that American horse owners tend to complete all care and training alone rather than rely on professionals. Research by Hockenhull and Creighton (2008b) suggests that this is also true of British horse owners, with books and magazines reported as the main sources used when owners seek advice on behavioural issues. The relatively larger numbers of dog over horse behaviour consultants may be due to a culture among horse owners to seek advice from peers rather than professionals. Where owners are content to seek advice from peers, practising horse behaviour consultants may not perceive the need to be registered.

In conclusion, the animal behaviour consultancy industry is in its infancy but the service has been readily taken up by dog and cat owners. The same is not true of horse owners, which indicates the need to promote animal behaviour consultancy within the horse owning population.

1.4 Justification for the research

Should animal behaviour consultants be widely used by horse owners, it would lead to wider promotion and recognition of the effectiveness of applying a thorough understanding of horse ethology and appropriate learning theory. This would minimise behaviour problems exhibited by the horse, aid good quality human-horse relationships and lessen the physical welfare issues and stress experienced by horses when owners use harsh aids, strong equipment and inappropriate punishment. It would also lesson wastage due to behavioural problems and improve the well-being of the owner by reducing their exposure to aversive experiences with their horse.

There is a need to promote animal behaviour consultants among horse owners and a starting point for this is to ensure that the services that are provided are successful. This research aimed to identify how horse behaviour consultants can provide an effective service and subsequently generate recommendations for their practises.

1.5 Research objectives

Abood (2007) argues that in order for veterinary services to be effective they require the client to comply or adhere to the advice offered. This is supported by Casey and Bradshaw (2008), who found a significant relationship between compliance to treatment plans and a reduction in the severity of feline behaviour problems. Therefore, to give recommendations on how horse behaviour consultants can provide an effective service, one must consider how consultants can promote adherence to their advice.

In order to adhere to a treatment programme the owner must often make changes to their lifestyle and behaviour (Casey & Bradshaw, 2008). The established science of human behaviour change predominantly lies in the field of health psychology, where effort has been made to change people's

behaviour to achieve health benefits and this gives a theoretical starting point to this study.

Changing human behaviour to establish adherence, for example to a treatment regime, a set of principles or an adaptive attitude, is affected by several factors (Table 1.1). The expanse of variables affecting adherence may explain why application of this theory generally focuses on specific elements rather than all of the possible variables. On the limited occasions when this theory has been applied to animal science this division is also present. Casey & Bradshaw (2008) focused their study on demographical and objective variables, whereas Hemsworth et al (1994) focused on a subjective psychological variable.

Table 1.1 Examples of factors that have the potential to influence adherence (Christensen, 2004; Myers & Midence, 1998).

Factors associated with the treatment	*Complexity*
	Degree of commitment required
	Cost
	Environmental and personal barriers that may prevent adherence
Factors associated with the practitioner	Qualifications
	Status
	Credibility
	Trustworthiness
	Interpersonal skills
	Confidence
Factors associated with the communication	Formal / informal
	Explicit / implicit
	Conducted face to face or not
	Pace
	Time dedicated to the client

Factors associated with the client	Personality
	Level of education
	Attitude
	Resistance to persuasion
	Level of social support available

The novelty of this research meant that there was no guidance on which approach to follow in this specific context. However, addressing variables associated with the practitioner or communication is problematic as it entails the use of consultants who are willing and able to modify their consultations in concordance with the research's needs. As the small size of the industry required several practitioners to generate an appropriate sample size, it was considered too difficult to find an appropriate number of consultants who would agree to participate should a method which was invasive to their practises be used.

Human social cognitive science has a well established theoretical background and methodology and gives clear guidance on cognitive variables that are associated with behaviour change (Conner & Norman, 1995b), which provides a sound starting point for a preliminary study, such as this. This approach also addressed some of the concerns raised above. Social cognition entails the processing of information and thoughts to form perceptions (Conner & Norman, 1995a; Eagly and Chaiken, 1993). Cognitive processes are considered to intervene between the acquisition of objective stimuli and the performance of observable behavioural responses. In the context of horse behaviour consultancy, one observable behavioural response may be adherence to the advice of the consultant. The objective stimuli may include the explicitness of the communication, the qualifications held by the consultant and the environment in which the communication occurs. In cognitive science, subjective beliefs (formed from experience and

contributed to by age and demographics) are added to the objective information during thought processes (Figure 1.1) and, together these two elements factor into the decision to perform the relevant behavioural response (Eagly and Chaiken, 1993). Therefore, it is considered that to best understand behaviour it must be viewed as a product of peoples' perceptions, rather than as a response to objective stimuli (Conner & Norman, 2005a). Cognitive variables are the end result of such deliberative processing of information and viewed in this way may be considered to transcend objective variables. This allows one to focus on measuring the client's cognitive standpoint as the outcome of all other variables and treat the actual consultation as a black box, which negates the need to be invasive to the practitioner's methods or time.

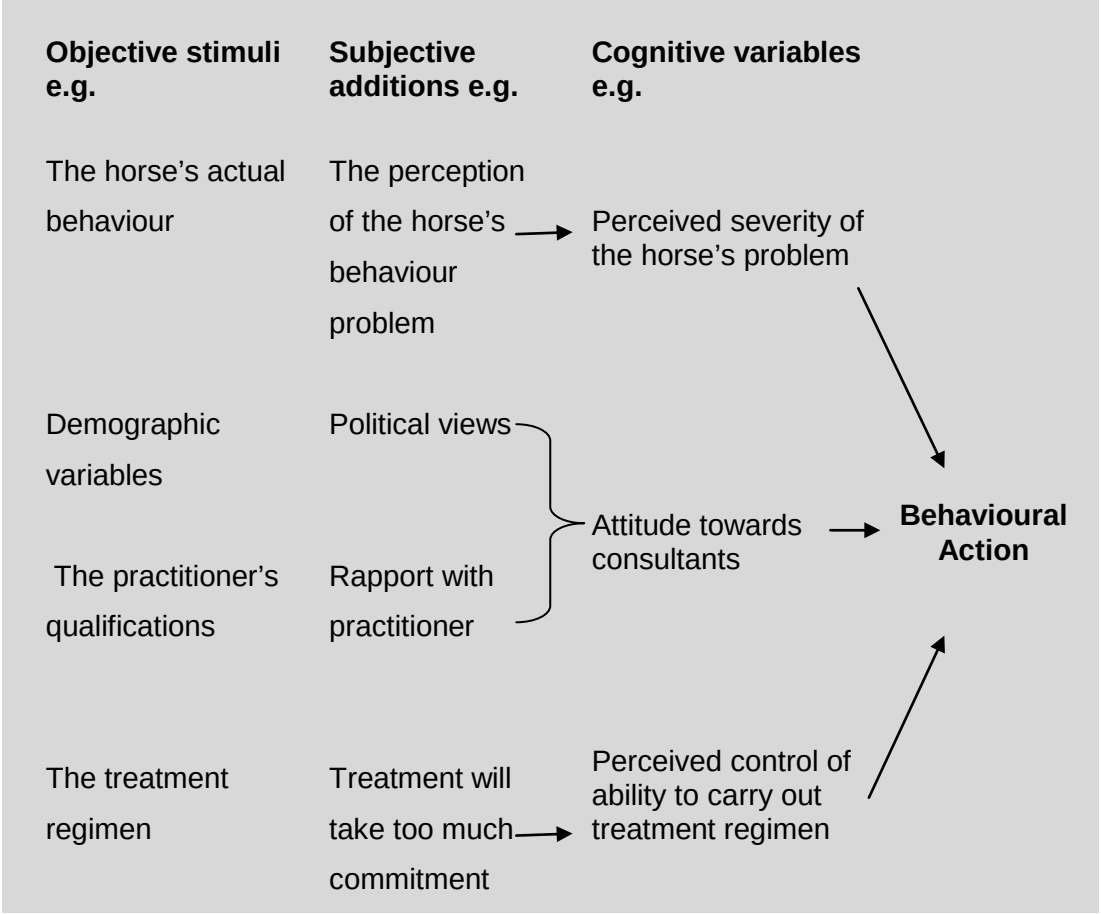


Figure 1.1 Diagram representing a cognitive science approach to the variables that have the potential to influence adherence (adapted from Conner & Norman, 1995b).

Casey and Bradshaw (2008) report a much larger degree of adherence when behaviour problems impact on the owner, as opposed to when they do not. This suggests that perceptions about the behaviour problem predict adherence and that cognitive variables are potential predictors of adherence in the context of animal behaviour consultancy. Casey and Bradshaw (2008) also include treatment complexity as a possible casual factor of this relationship. However, the social cognition approach argues that cognitive variables are the outcome of the client's interpretation of the consultation. Under this approach, treatment complexity would factor into the cognition associated with the client's perceived control over adhering to the treatment, and where perceived control over adhering to treatment is measured treatment complexity may be accounted for.

Casey and Bradshaw (2008) found the gender of the owner and the number of people in the household to have a significant relationship with adherence. The number of people in the household is less relevant to the context of horse behaviour consultancy where the horse does not reside in the family home and often there is only one main carer. In addition, the relationship found was weak and so is of less interest than the perceptions about the behaviour problem (cognitive variable), where the difference in adherence between groups was large. A large difference in adherence was, however, found between the genders of the owners, with females participating in significantly more adherence. This suggests that the cognitions affecting adherence are not independent of gender and that the gender of the owner should be considered in this research.

Hemsworth et al (1994) found that the attitude of stock people had a significant effect on their behaviour towards pigs. This again provides evidence of an association between a cognitive variable and behaviour in the context of animal care, which offers further support for measuring cognitive variables. They also found that exposing stock people to communications where the contents aimed to develop a positive attitude towards pigs had a positive effect on their subsequent behaviour towards pigs. This showed that,

focusing the communication on a cognitive variable relevant to the adaptive behaviour was an important factor in eliciting adherence to that behaviour.

The studies by Casey and Bradshaw (2008) and Hemsworth et al (1994) demonstrate the potential for adherence to be influenced by cognitive variables. However, a more comprehensive survey of potential predictors of adherence in the context of animal behaviour consultancy is needed. This formed the basis of the specific objectives of this research, as follows;

I. To review the social cognition models to identify cognitive variables to explore in this research context.

II. To establish which of those cognitive variables had associations with adherence to the advice of a horse behaviour consultant.

III. To establish whether the type of communication (i.e. individual consultation, group workshop or a larger scale demonstration), the rider's gender, age, type and level of skill had an impact on adherence.

IV. To develop recommendations for horse behaviour consultants on how to encourage adherence to their advice.

It must be acknowledged that the social cognition approach may omit some of the variance in adherence, as it is an observational approach and does not control for objective variables such as the appropriateness of the advice. The horse behaviour consultants used in this study were selected according to their use of ethologically appropriate advice as evidenced by reviewing the consultant's website or promotional material, or through communications with the consultant. This ensured that the research was conducted within a constructive section of the industry and helped to standardise the theoretical basis of the consultants' communications. The technical validity of the advice given may affect the resolution of the problem which may impact upon adherence, using horse behaviour consultants who based their methods on sound scientific principle minimised this potential influence. In addition, the

impact of the type the communication on adherence was included in the research aims, along with the impact of some owner demographics. Consideration of these variables, in addition to the cognitive variables, enabled one to gain a fuller picture of factors affecting adherence in the context of horse behaviour consultancy.

CHAPTER 2

Theoretical background

2.1 A review of the social cognition models

In health psychology social cognition models have provided valid and reliable tools for predicting behavioural outcomes in a range of settings, for example healthy eating (e.g. Booth-Butterfield & Reger, 2004), smoking cessation (e.g. Kraft et al, 1999) and heavy alcohol intake (e.g. Neal & Carey, 2004). The models enable researchers to establish specific cognitive variables that predict behaviour. Therefore social cognition models offer a starting point for establishing which cognitive variables in horse owners predict adherence to the advice of a horse behaviour consultant.

Bandura's (1977) social cognitive theory (SCT) suggests that when deciding to perform a behaviour people consider three things: how they expect the situation to develop if they take no personal action, whether personal action will be effective and, therefore, valued and their personal competence at performing the action. Expectancy and value are underlying elements of all social cognition models; what people expect to be the outcome of an event and how much they value the outcome determine the action that they take (Bandura, 1977). This underpinning theory has given rise to several social cognition models. However, each model is based upon an individual interpretation of expectancy and value and generates variables that are specific to that interpretation, leading to a number of cognitive variables that are thought to predict behaviour in a number of different settings.

Under the umbrella of social cognition models, three main approaches emerge: attribution theory, path models and stages of change models. The stages of change models do not provide a set of cognitive variables to predict behaviour, rather they are aimed at establishing points in the process of change where an intervention would be most effective (e.g. Segan et al,

2004). In contrast, attribution theory and path models give rise to a number of cognitive variables that have an association with behaviour. These models were examined further to establish a list of cognitive variables that could be potential predictors of adherence to the advice of a horse behaviour consultant. Because of the novel nature of this research it was not known whether all or any of the cognitive variables were good predictors of adherence to the advice of a horse behaviour consultant, therefore, the basis for inclusion fell to the strength of the variables to predict behavioural changes as evidenced by past research.

2.1.1 Attribution Theory

Attribution theory explains behaviour by ascribing past experiences as explanations for present behaviours (Weiner, 1990). In its full form attribution theory is a multi-dimensional model. Most cognitive scientists now recognise three dimensions of internality, stability and globality (Hilt, 2004). Internality refers to the extent that a cause is perceived to be due to internal factors or external factors. Stability refers to how permanent the cause is and how likely it is to occur in the future. Globality refers to whether the cause is perceived to be specific to a situation or general across any situation. Where an individual is positioned across these dimensions determines how controllable a cause is perceived to be (Figure 2.1). Controllability has been considered as a separate fourth dimension, however, discussion of this is limited (Hewitt et al, 2004; King, 1982).

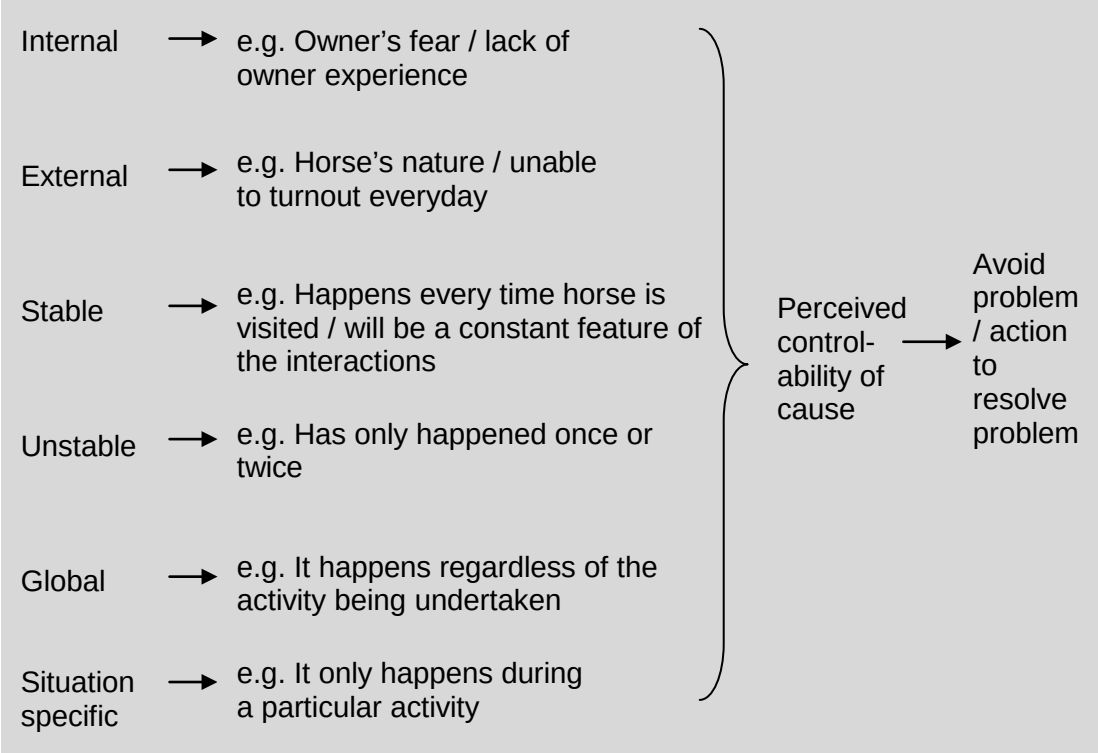


Figure 2.1 Diagram representing multi-dimensional attribution theory (adapted from Hilt, 2004) and showing its potential application to horse behaviour consultancy.

Attribution theory has been applied to complex and emotive settings, for example, depression, helplessness, conflict in relationships and achievement motivation, where the positioning across all dimensions contributes towards generating a complex attributional style that predicts behaviour (Forsterling, 1988; Graham & Folkes, 1990). Where attribution theory has been applied to adherence behaviour, King (1982) found a significant relationship between attendance at high blood pressure screening and the dimension of internality. However, she did not find stability and globality to have significant associations with attendance at screening. Studies carried out post King (1982) that correlate attribution variables directly with an adaptive behaviour, in a similar manor as was conducted here, focus on the internality dimension alone and also provide support for a significant association between this and behaviour (e.g. Pedroso Goncalves et al, 2008; Talyor et al, 1984). The absence of the stability and globality dimensions from such studies suggests that they are of less importance. Personal communication with practising

horse behaviour consultants support this, as they refer to horse owners attributing their horse's behaviour problem to the horse's inherent character, constraints on resources such as time and money and their own behaviour, but do not refer to the stability or globality of the problem. Whereas stability and globality contribute to how controllable a cause is perceived to be, King (1982) suggests that the internality dimension is the most proximate predictor of adherence and this may also be true of this context. King (1982) also measured controllability as a separate variable and found it to have an association with attendance, however, there is minimal consideration of this dimension as a separate variable (King, 1982; Hewitt et al, 2004). In conclusion, this study focused on the internality dimension alone.

The internality dimension is itself multi-dimensional and is separated into two cognitive variables: a measure of internality and a measure of externality (e.g. King, 1982; Pedroso Goncalves et al, 2008; Talyor et al, 1984). The measure of internality addresses the extent that a cause is perceived to be due one's self or own behaviour. The measure of externality addresses the extent that a cause is perceived to be due to environmental factors or factors other than one's self. In relation to horse behaviour consultancy, and this research, the internal cognitive variable is defined as: the degree to which the client perceives their horse's behaviour problem to be due to their own behaviour, referred to as *attribution of the horse's behaviour problem to own behaviour* (Table 2.1 – summary at end of section 2.1). The external cognitive variable is defined as: the degree to which the client perceives their horse's behaviour problem to be due to environmental factors other than self, referred to as *attribution of the horse's behaviour problem to external factors* (Table 2.1 – summary at end of section 2.1).

Attribution theory suggests that where a cause is perceived to be internal often a negative emotion is present (e.g. fear; Forsterling, 1988; Hilt, 2004). The negative emotion may motivate the individual to value resolving the cause of the problem (Forsterling, 1988). Hence, where a client largely perceives an internal cause to their horse's behaviour problem (e.g. lack of own experience) they may be motivated to resolve it and, in turn, adhere to

the advice of a horse behaviour consultant. However, the negative emotion may also cause the individual to feel overwhelmed by the problem and unable to address it (Forstling, 1988) and in this circumstance the individual may not address the problem. In the context of horse behaviour consultancy they may opt to sell the horse instead. Where an external cause is perceived the individual may consider themselves to have no control over it and, therefore, be resigned to being unable to resolve it (Forstling, 1988). Hence, where a client largely perceived an external cause to their horse's behaviour problem (e.g. horse's nature) they may feel that they are unable to influence it and, in turn, may not address the problem. In essence both extremes of internally attributing a cause and externally attributing a cause are maladaptive.

Studies have reported both negative (e.g. Pedroso Goncalves et al, 2008; Taylor et al, 1984) and positive (King, 1982) associations with the degree of externality and degree that adaptive behaviour is undertaken. It is possible that the relationship that perceived causal attributions have with adaptive behaviour is not universal but is dependent on context, which gives no indication of the direction of potential relationships between causal attribution and adherence to the advice of a horse behaviour consultant.

In summary, the internality dimension of attribution theory has a significant association with behaviour. The dimension is considered as two cognitive variables, one assessing the degree to which a cause is perceived as internal (*attribution of the horse's behaviour problem to own behaviour*) and one assessing the degree to which a cause is perceived as external (*attribution of the horse's behaviour problem to external factors*). These variables were considered without assumption of the direction of their relationships with adherence to the advice of a horse behaviour consultant.

2.1.2 Path Models

Path models can be depicted as pathways ascribing specific cognitive variables to a behaviour or behaviour change. Within the different path models there is a large degree of overlap in the cognitive variables associated with behaviour and this suggests consistency in the processes that affect behaviour. These cognitive variables are reviewed below.

2.1.2.1 Perceived control

Attribution theory prompted researchers to consider the perceived controllability of a cause of an event and Rotter (1954; cited in Conner & Norman, 2005b) developed the idea to establish the locus of control model. Rotter's locus of control consisted of a uni-dimensional scale of *internal control* (events are perceived to be the consequence of own actions) and *external control* (events are perceived to be the consequence of the environment; Conner & Norman, 2005b). The theory proposed that where individuals had an internal tendency they were more likely to perceive control over their ability to employ instrumental behaviour and take the necessary action (Conner & Norman, 2005b). This was later developed to create a multi-dimensional health locus of control (MHLC; Wallston, 1978). The new scale considered *perceived control* in sub divisions of: 1) beliefs about an event being brought about by own actions; 2) beliefs about an event being subject to the actions of powerful others; 3) beliefs about an event being due to fate or chance (Figure 2.2). It was later implied that believing that an outcome may be due to chance demonstrates perceiving a complete lack of control and, should, therefore, not be included (Wallston, 1992).

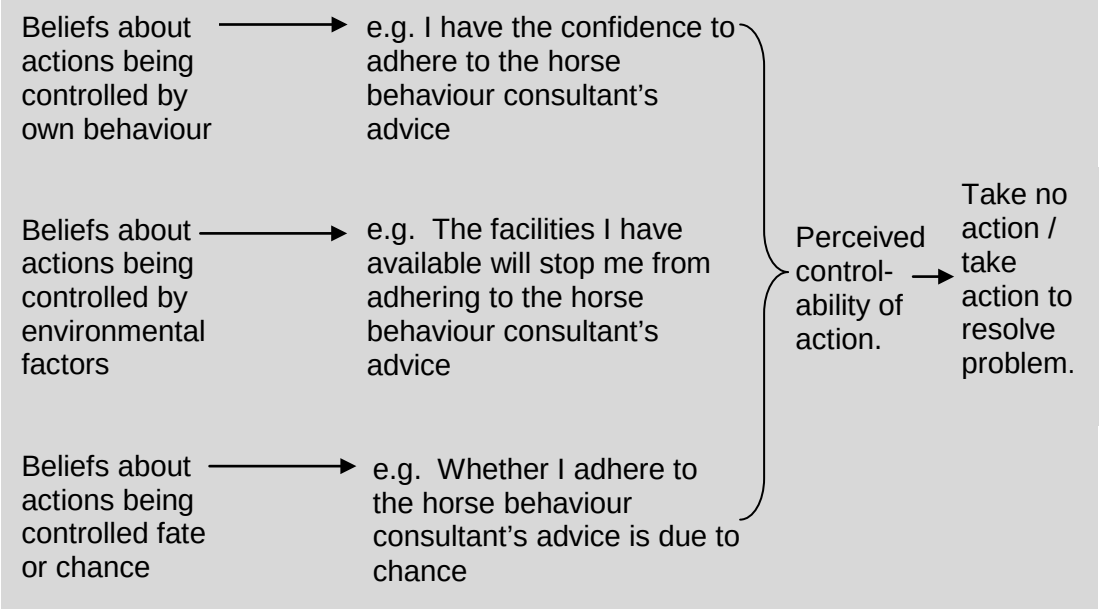


Figure 2.2 Diagram representing multi-dimensional locus of control (adapted from Conner & Norman, 1995b) and showing its potential application to horse behaviour consultancy.

The theory of reasoned action (TRA; Azjen & Fishbein, 1980; Figure 2.3) was developed to include the variable *perceived behavioural control* and became the theory of planned behaviour (TPB; Azjen, 1988). *Perceived behaviour control* is a cognitive variable concerned with whether an individual perceives that they are able to perform an action successfully (Conner & Sparks, 2005). In the past *perceived behavioural control* contained both external control and internal control elements, assessing the individual's perceptions about whether they had access to necessary resources and their personal competencies to perform the action (Conner & Sparks, 2005). However, following their meta-analysis Armitage and Conner (2001) suggest that *internal control* should be measured separately in the form of *self-efficacy* (the belief in one's ability to perform a behaviour).

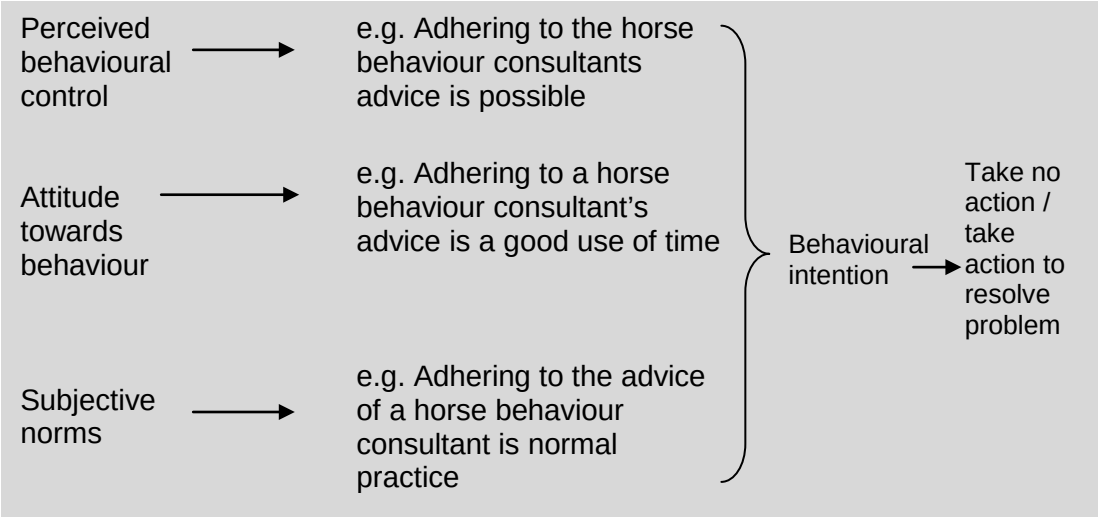


Figure 2.3 Diagram representing the TPB (adapted from Conner & Norman, 1995b) and showing its potential application to horse behaviour consultancy.

The Health belief Model (HBM; Figure 2.4) suggests that a combination of *perceived susceptibility* to developing an illness, *perceived severity* of the illness, *perceived benefit* of taking specified action to avoid it and *perceived barriers* to performing the action predict whether it will be taken (Abraham & Sheeran, 2005). *Perceived barriers* concerns the individual's perceptions of things that prevent them from successfully carrying out the instrumental behaviour (Abraham & Sheeran, 2005).

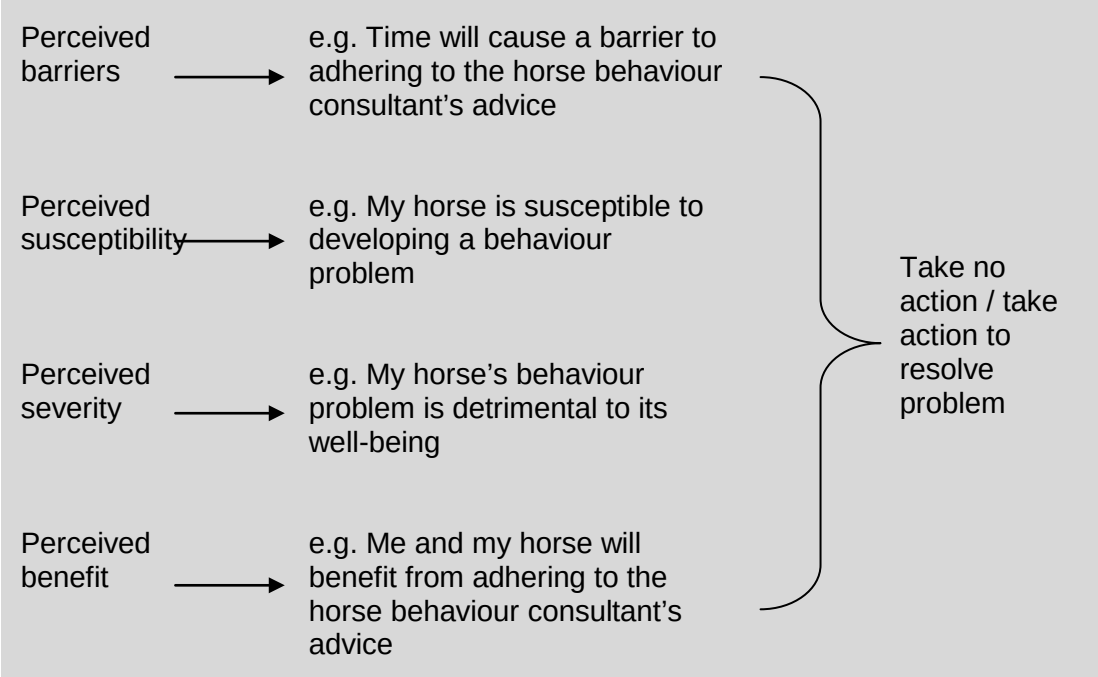


Figure 2.4 Diagram representing the HBM (adapted from Conner & Norman, 1995b) and showing its potential application to horse behaviour consultancy.

In summation of the *perceived control* variable as presented in these models, it can be separated into an internal and external component, which should be considered as separate variables. The internal and external variables are respectively defined as: the extent that one believes in their ability to perform a behaviour and the extent that one believes that environmental factors (other than self) will control their ability to perform a behaviour.

There is variation in the predictive power of the perceived control variables, possibly due to variation in how it is interpreted across the models. Research into the MHLC produced only small associations with behaviour, however, some of these were statistically significant (reviewed in Wallston, 1992). The HMB component *perceived barriers* has been reported to have a small but significant association with behaviour (Abraham & Sheeran, 2005; Harrison, Mullen & Green, 1992), although it was reported as the most proximate predictor of behaviour from that model (Abraham & Sheeran, 2005). Meta-analyses of the TPB report *perceived behavioural control* as having a moderate association with behaviour (Armitage & Conner, 2001) and also report it to be the most proximate predictor from the model. *Perceived behavioural control* was considered an important revision of the TRA to form

the TPB (Godin, 1993) and reviews have argued that perceived control is over-all the most proximate predictor of behaviour (Schwarzer, 1992). Despite the variation in strength, the presence of significant findings supports the need to include internal and external control variables as potential predictors of adherence to the advice of a horse behaviour consultant.

Human-horse interactions are subject to the rider, for example, their level confidence, skill and experience. The extent that these factors are perceived to affect the horse and rider, and the level of control the rider perceives they have over these factors, will impact on the interaction. In this research, the internal control variable is defined as: the extent that the client perceives themselves personally capable of adhering to the advice, referred to as *self-efficacy of adhering to the advice* (Table 2.1 – summary at end of section 2.1). Analyses of this variable suggest that it has a positive relationship with behaviour (Armitage & Conner, 2001; Milne et al, 2002). Hence, in a horse behaviour consultancy context, where clients perceive themselves to have self-efficacy over adhering to the advice they are likely to adhere. However, no evidence suggested that this relationship would be present in the novel context of horse behaviour consultancy. Therefore, caution was exercised and this variable was considered without assumption of the direction of its relationship with adherence to the advice of a horse behaviour consultant.

Human-horse interactions are also subject to the external environment, for example the availability of a ménage and the presence or absence of other horses. In this research, the external control variable is defined as: the extent that the client perceives that environmental factors control their ability to adhere to the advice, referred to as *extent that external barriers will prevent adherence to the advice* (Table 2.1 – summary at end of section 2.1). Analyses of this variable suggest that it has a negative relationship with adaptive behaviour (Abraham & Sheeran, 2005; Harrison et al, 1992). Hence, in a horse behaviour consultancy context, where clients perceive that external barriers will prevent them from adhering to the advice they are not likely to adhere. However, again the novel use of this variable in relation to horse behaviour consultancy meant that no assumptions were drawn upon

the direction of its relationship with adherence to the advice of a horse behaviour consultant.

2.1.2.2 Value

The perceived value of the outcome of an action is an underlying element of social cognition (Bandura, 1977). The majority of studies measure value as a factor of another variable by weighting it against that variable (reviewed in Conner & Norman, 1995b). However, in his review Wallston (1992) suggested that the MHLC was more effective when the *value* people ascribed to their health was added as a separate variable, potentially making *value* a more proximate determination of behaviour than the *perceived control* variables of the MHLC. The need to assess the extent that individuals value their health as a separate variable was later supported by Furnham and Steele (1993). This prompts the need to include a measure of *value* as a separate cognitive variable and potential predictor of adherence to the advice of a horse behaviour consultant. This is further supported by a strong association between value and behaviour when value is measured as a separate variable (Arezes & Miguel, 2008).

Whereas Wallston (1992) and Furnham and Steele (1993) refer to the extent that individuals value their health, in this research context it relates to the extent that resolving the horse's behaviour problem is valued. Assuming that adherence results in the resolution of the behaviour problem, this variable is defined as the extent that individuals value the outcome of adhering to the advice, referred to as *value of the outcome of adhering to the advice* (Table 2.1 – summary at the end of section 2.1).

Where an outcome is valued the instrumental behaviour is employed (Bandura, 1977), hence where clients value rectifying their horse's behaviour problem, adherence to the advice of the horse behaviour consultant should occur. This positive relationship is supported by Wallston (1992) and Arezes and Miguel (2008). However, again there is no evidence of this relationship

in the novel context of horse behaviour consultancy and so, cautiously, the direction of a relationship between *value of the outcome of adhering to the advice* and adherence to the advice of a horse behaviour consultant was not assumed.

2.1.2.3 Perceived susceptibility, perceived severity and perceived benefit

Perceived susceptibility is the extent that one believes oneself to be susceptible to an event occurring. *Perceived severity* is the extent that one perceives an event is severe or detrimental to oneself. *Perceived benefit* and *response effic*acy are the extent that one believes that one will benefit from the action taken, or similarly that an action will resolve an issue. *Perceived susceptibility*, *perceived severity* and *perceived benefit* are components of the HBM (Janz & Becker, 1984). *Perceived severity* is also a component of protection motivation theory (PMT; Rogers, 1975), as is r*esponse efficacy*, which can be likened to *perceived benefit*.

Meta-analyses of these variables have found them to be weak but significant predictors of behaviour (Abraham & Sheeran, 2005; Milne et al, 2000; Harrsion et al, 1992). It has been suggested that the weak effect sizes found may be due to the ambiguity in the variables and their lack of definition contributing to colinearity (Harrison et al, 1992). The significant association with behaviour, however weak, and the popularity of the HBM suggests that it is possible that these variables also have an association with adherence to the advice of a horse behaviour consultant.

The HBM and PMT propose that where an individual perceives an event to be severely detrimental to their health and that they are susceptible to its occurrence, they are likely to value a behavioural action that avoids it. If the individual also perceives that the behavioural action will successfully enable them to avoid the event, therefore, meaning that they will benefit from performing that action, they are likely to adopt the recommended behaviour (Abraham & Sheeran, 2005; Norman et al, 2005). In summary, the largest

combination of perceived threat and perceived control over avoiding the threat give rise to instrumental behaviour (Abraham & Sheeran, 2005; Norman et al, 2005).

In relation to horse behaviour consultancy, these variables are defined as: the extent that the client believes their horse is susceptible to developing a behaviour problem, referred to as *perceived susceptibility of the horse developing a behaviour problem* (Table 2.1 – summary at the end of section 2.1); the extent that the client believes that their horse's behaviour problem is severe, referred to as *perceived severity of the horse's behaviour problem* (Table 2.1 – summary at the end of section 2.1); the extent that the client believes they will benefit from resolving their horse's behaviour problem and that following the advice will resolve the problem, referred to as *perceived benefit of adhering to the advice* (Table 2.1 – summary at the end of section 2.1). Where the horse is perceived to be susceptible to developing a behaviour problem, or an existing one worsening, and that behaviour problem is perceived to be detrimental either to the horse or owner's health, or to their relationship, the owner will value taking action to avoid occurrences of the problem. In turn, if they perceive that following the advice of a horse behaviour consultant will benefit them and enable them to prevent the behaviour problem occurring, adherence to the advice will occur.

Positive relationships have been found between each of these variables and behaviour (Abraham & Sheeran, 2005; Harrsion et al, 1992; Milne, 2000). However, again there is no evidence of these relationships in this research's specific context, and so the direction of any relationship between these variables and adherence to the advice of a horse behaviour consultant was not assumed.

2.1.2.4 Attitude and subjective norms

Attitudes are functions of salient beliefs and outcome expectancies regarding a subject (Eagly & Chaiken, 1993). *Subjective norms* are functions of beliefs

about the preferences of others around the individual (normative beliefs) and how much the individual is compelled to comply with them (Eagly & Chaiken, 1993). *Attitude* and *subjective norms* form components of the TRA and TPB (Azjen, 1988; Azjen & Fishbein, 1980). The TRA and TPB suggest that *attitude* and *subjective norms* have a direct effect on intention, which has a direct effect on behaviour (Azjen & Fishbein, 1980).

The TRA and TPB are the most extensively used models in health psychology with numerous studies utilising, or aiming to test the theories (e.g. Booth-Butterfield & Reger, 2004, Godin, 1993, Hardman et.al. 2002). Their continuance in the field of health psychology was an encouraging factor for the inclusion of their components. In meta-analyses *attitude* has been found to have a moderate association with intention, and although slightly weaker, also an association directly with behaviour (Armitage & Conner, 2001). Hence, there is sufficient evidence that *attitude* may be a potential predictor of adherence to the advice of a horse behaviour consultant.

Meta-analyses of the components of the TPB suggest that *subjective norms* are not as strong predictors of behaviour as the other components of the model (Armitage & Conner, 2001). However, some studies have found *subjective norms* to be a moderate predictor of behaviour (e.g. Quick et al, 2008) and this suggests that it is possible this variable also has an association with adherence to the advice of a horse behaviour consultant.

The TRA proposes that where a person holds a positive attitude towards a behaviour they are more likely to have intention towards performing it, and thus take action (Ajzen, 1988). In the context of horse behaviour consultancy, prior to the communication the client could have little knowledge about what actions the consultant would asked them to undertake to resolve their horse's behaviour problem. Therefore, attitude towards the behaviour cannot be measured. Instead, the attitude variable in this research was defined by beliefs about horse behaviour consultants and expectancies about their ability to resolve behaviour problems, which would factor into a client's attitude towards them (Table 2.1 – summary at the end of section 2.1). This

variable is subsequently referred to as *attitude towards horse behaviour consultants* (Table 2.1 - summary at the end of the section). The interpretation of this variable is novel and specific to this research context and, therefore, no evidence is available to support the direction of any relationship between itself and adherence to the advice of a horse behaviour consultant.

In this research *subjective norms* (referred to as such) was defined by beliefs about whether the use of horse behaviour consultants is normal practice. The TRA proposes that where an individual holds a positive attitude towards a behaviour and perceives this behaviour to be the norm, or if it is not perceived to be the norm the subject is not compelled to comply, the behaviour will be adopted. Hence, where the use of a horse behaviour consultant is considered normal practice, or if not, the client is not compelled to comply with normal practice, adherence to the advice of a horse behaviour consultant will occur. As with the other variables, no evidence supports the direction of a relationship between this variable and adherence to the advice of a horse behaviour consultant, therefore, to exercise caution it was not assumed.

2.1.3 Potential predictors of adherence to the advice of a horse behaviour consultant

Each of the major social cognition models determines a set of cognitive variables that are considered good predictors of behaviour. These are key variables that demonstrate, through their prevalence in the literature and associations with behaviour, that they are predictors of behaviour. As this study was explorative in nature, cognitive variables with reasonable evidence of their ability to predict behaviour from main meta-analyses or reviews were included.

In light of this review it was concluded that the following cognitive variables had merit as a potential predictor of adherence to the advice of a horse behaviour consultant:

- *Attribution of the horse's behaviour problem to internal factors*
- *Attribution of the horse's behaviour problem to external factors*
- *Self-efficacy of adhering to the advice*
- *Extent that external barriers will prevent adherence to the advice*
- *Value of the outcome of adhering to the advice*
- *Perceived susceptibility of the horse developing a behaviour problem*
- *Perceived severity of the horse's behaviour problem*
- *Perceived benefit of adhering to the advice*
- *Attitude towards horse behaviour consultants*
- *Subjective norms*

Table 2.1 Summary of the cognitive variables included in this study and their subject-specific interpretation for this study.

Variable as named in respective model	*Definition / description in relation to this research*	*Variable as referred to in this research*
Internal causal attribution	The degree to which the client perceives their horse's behaviour problem to be due to their own behaviour	Attribution of the horse's behaviour problem to own behaviour
External causal attribution	The degree to which the client perceives their horse's behaviour problem to be due to environmental factors other than self	Attribution of the horse's behaviour problem to external factors
Internal control / self-efficacy	The extent that the client perceives themselves personally capable of adhering to the advice	Self-efficacy of adhering to the advice
External control	The extent that the client perceives that environmental factors control their ability to adhere to the advice	Extent that external barriers will prevent adherence to the advice
Value	Whether clients value rectifying their horse's behaviour problem	Value of the outcome of adhering to the advice
Perceived susceptibility	The extent that the client believes their horse is susceptible to developing a behaviour problem	Perceived susceptibility of the horse developing a behaviour problem

Perceived severity	The extent that the client believes that their horse's behaviour problem is severe	Perceived severity of the horse's behaviour problem
Perceived benefit / Response efficacy	The extent that the client believes they will benefit from resolving their horse's behaviour problem and that following the advice will resolve the problem	Perceived benefit of adhering to the advice
Attitude	Beliefs about horse behaviour consultants and expectancies about their ability to resolve behaviour problems	Attitude towards horse behaviour consultants
Subjective norms	Beliefs about whether the use of horse behaviour consultants is normal practice	Subjective norms

2.2 Specific research aims

Successful behaviour consultancy processes are dependent on the owner's adherence to the advice that they are given (Casey & Bradshaw, 2008). Reviews of social cognition models have provided a list of cognitive variables that are potential predictors of behaviour and, therefore, are potential predictors of adherence. Due to the exploratory nature of this research all of the potential valid predictors of behaviour were required to be measured. This research aimed to explore individual associations between each of the cognitive variables and adherence to the advice of a horse behaviour consultant. The specific research aims were to establish whether *attribution of the horse's behaviour problem to internal factors*; a*ttribution of the horse's behaviour problem to external factors*; *self-efficacy of adhering to the advice*; *extent that external barriers will prevent adherence to the advice*; *value of the outcome of adhering to the advice*; *perceived susceptibility of the horse developing a behaviour problem*; *perceived severity of the horse's behaviour problem*; *perceived benefit of adhering to the advice*; *attitude towards horse behaviour consultants*; *subjective norms* had an association with adherence to the advice of a horse behaviour consultant.

Due to the novelty of the research, it was unknown whether associations between each of the cognitive variables and adherence to the advice of a horse behaviour consultant would be found, therefore, there was no expectation in relation to the findings and two tailed analyses were conducted.

CHAPTER 3

Methodology

3.1 Materials

3.1.1 Measuring cognitive variables

Cognitive variables are hard to define objectively and, therefore, cannot be objectively measured. Rather, researchers have quantified these variables by the use of subjective Likert scales (e.g. Beaudoin & Fernandez, 2007; Booth- Butterfield & Reger, 2004; Frostholm et al, 2007; Hearty et al, 2007; Schroder et al, 2007). The scales are developed by generating a collection of statements (items) that correspond with the variable and are specific to the research context. The statements act as objective indicators that provide respondents with a grounding from which they can demonstrate their position. An example is shown in Figure 3.1. The individual items for each variable may then be complied into a questionnaire that addresses a specific research question.

I feel under social pressure to refer patients who have lower back pain for x-ray

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Figure 3.1 An example of a Likert scale (Francis et al, 2004). The statement gives an objective indictor which allows the respondent to rate their perception of *subjective norms*. The example illustrates how a subjective variable can be quantified and measured.

Likert scales provide quantifiable measures that are relatively straightforward to construct. When used in a consistent style they offer the respondent a familiar format that encourages compliance (Neuman, 2000) and they provide a method of measuring cognitive variables that are considered

simple and engaging for the respondents to complete (Neuman, 2000). The simplicity of Likert scales is suggested as a distinct advantage because if they evoke voluntary compliance the respondent may give more consideration to their answers (Robson, 1993), this suggests that Likert scales are likely to produce reliable answers.

Likert scales are widely used in health psychology (Rutter & Quine, 2005), however, there are drawbacks to using them. They require the participant to rank where they fall on a variable and, thus, provide ordinal data. The use of ordinal data is a limitation because data that is intended to be used with most parametric statistical tools should be at least interval (Field, 2000). However, standard texts on the measurement of psychological characteristics argue that the scales can be thought to represent linear dimensions of a variable monotonically related to the true variable, allowing them to be thought of as continuous and equally spaced and, therefore, analysed as so (Oppenheim, 1992; Eagly & Chaiken, 1993). Further to this, Aiken (1997) argues that parametric tests are robust enough to allow for inaccuracies in the assumption that the data is of at least interval. Aiken (1997), Eagly and Chaiken (1993) and Oppenheim (1992) all highlight that where data produced by Likert scales is normally distributed they are commonly analysed using parametric statistics and this is reflected in articles of peer review journals (e.g. Dunn et al, 2003; Johnston & White, 2003; King, 1982; Latimer & Martin Ginis, 2005; Pedroso Goncalves et al, 2008; Segan at al, 2004).

Likert scales also give no indication as to why a respondent has selected a particular position on the scale. Page-Bucci (2003) refers to this as a lack of conceptual clarity. Yet, this is a constraint of most data based on giving a numerical answer to any question and conceptual clarity may be unachievable with any quantative approach, because to achieve a greater understanding of ‘why?’ one must engage in open questions that are impossible to value numerically with accuracy. As this study aimed to establish which cognitive variables are predictors of adherence to the advice of a horse behaviour consultant, a deeper analysis of why respondents rate

themselves the way that they do was outside the aims of this study, but could form future projects.

For this study the advantages of Likert scales, most prominently their simple and familiar style encouraging compliance, were considered to outweigh their limitations. The use of Likert scales also follows a methodology that is common in social science research. Hence, the questionnaire developed to answer the research aims consisted of Likert scales that corresponded to the respondent's self rating of each of the cognitive variables identified in Chapter Two.

3.1.2 Construction of test items

Due to the novelty of this research area there was no previously developed questionnaire that could be used to measure the desired set of cognitive variables. Therefore a research specific questionnaire was developed.

Following Aiken (1997) and Oppenheim (1992), the construction of the items first followed a deductive approach. Definitions of each of the cognitive variables were sought from relevant literature. Few concrete definitions of the variables were found because the wording associated with the variable was often dependent on the context of the individual study. However, the wider literature and the phrasing of relevant items did uncover key words associated with each variable (Conner & Norman, 1995; Francis et al, 2004; Johnson et al, 1995; Illness Perception Questionnaire, 2005). These key words were used to generate a construct space for each of the cognitive variables identified in Chapter Two. The construct space consisted of all the cognitions associated with each individual variable and, therefore, could be varied (Aiken, 1997).

The construct space for the cognitive variables *attribution of the horse's behaviour problem to own behaviour*, *value of the outcome of adhering to the advice* and *perceived susceptibility of the horse developing a behaviour*

problem were completed after reviewing definitions and key words in health psychology literature (Conner & Norman, 1995b; Francis et al, 2004; Johnson et al, 1995; Illness Perception Questionnaire, 2005). These variables were relatively closed in comparison to the others. The participant was able to rate how much they believe that their own behaviour had caused their horse's behaviour problem; how much they valued the outcome of adhering to the advice, which may have been the resolution of the horse's behaviour problem; and how susceptible they felt their horse was to developing a behaviour problem, or an existing problem worsening. As there were no other dimensions to these variables their construct spaces were relatively limited and so needed no further development. Hence, these variables were represented by single items (Table 3.1).

Aiken (1997) and Oppenheim (1992) suggest that in order to reduce deception and encourage respondents to consider their answers, scales should contain items with both positively and negatively worded statements and this was followed in the construction of the test items. The resulting items for the cognitive variables *attribution of the horse's behaviour problem to own behaviour*, *value of the outcome of adhering to the advice* and *perceived susceptibility of the horse developing a behaviour problem* can be viewed in Table 3.1.

Table 3.1 The statements used in the items of each of the cognitive variables. Also shown are the r values of 1-tailed correlation analyses between the score for the individual item and the total score of all items for that variable used to establish internal consistency.

Cognitive variable	*Item*	*r*	*p*
Attribution of the horse's behaviour problem to own behaviour	1. My own behaviour has contributed to the development of my horse's behaviour problems	NA	
Value of the outcome of adhering to the advice	1. Achieving an improvement in my horse's behaviour is of great value to me	NA	
Perceived susceptibility of the horse developing a behaviour problem	a. I feel that my horse is unlikely to develop a behavioural problem	NA	
	b. I feel that my horse and I are susceptible to developing behavioural problems that are worse than we already have	NA	
Self-efficacy of adhering to the advice	1. I am directly responsible for completing the programme of advice	NA	
	2. I feel unsure that I can complete the programme of advice without continuous support	NA	
Subjective norms	1. I feel there is social pressure not to use an equine behaviour advisor	NA	

	2. I will follow the programme of advice even if others around me disapprove	NA	
Perceived benefit of adhering to the advice	1. My horse and I will benefit greatly from completing the programme of advice	NA	
	2. By completing the programme of advice I am likely to minimise my horse's behavioural problems / minimise the possibility of my horse developing behavioural problems	NA	
Extent that external barriers will prevent adherence to the advice	1. I believe I may struggle to access the training facilities I need to complete the programme of advice	0.799	0.000
	2. I believe I may struggle to find the time I need to complete the programme of advice	0.797	0.000
	3. I believe I may struggle to find the money I need to complete the programme of advice	0.741	0.020
	4. I worry that my horse won't respond to the programme of advice	0.795	0.000
	5. The actions of other people will prevent me from following the programme of advice	0.518^{+}	0.048
Perceived severity of the horse's behaviour problem	1. My horse's behavioural problems are detrimental to its own well being	0.769^{+}	0.001

	2. My horse's behavioural problems are detrimental to my well being and/or the well being of people around me	0.929[+]	0.000
	3. My horse's behavioural problems interfere with the activities (work) I'd like to do with my horse	0.852[+]	0.000
Attribution of the horse's behaviour problem to external factors.	1. The training facilities I have available have contributed to the development of my horse's behavioural problems	0.627[+]	0.012
	2. Lack of time to spend with my horse has contributed to the development of my horse's behavioural problems	0.793[+]	0.000
	3. Lack of money available has contributed to the development of my horse's behavioural problems	0.687[+]	0.005
	4. My horse was always destined to develop behavioural problems because that is the way he/she is	0.710[+]	0.030
	5. The actions of other people have contributed to the development of my horse's behavioural problems	0.493	0.062
Attitude towards horse behaviour consultants	1. Equine behaviour advisors are only effective if academically qualified in an appropriate subject	.159	.286
	2. Methods used by some equine behaviour advisors, such as reward and positive reinforcement, should be used in all training of horses	0.538	0.019

	3. Equine behaviour advisors are only effective if the advisor works with both the horse and owner	0.525[+]	0.022
	4. Equine behaviour advisors are always effective at solving equine behaviour problems	0.568	0.014
	5. All equine behaviour advisors are good at their job	0.456[+]	0.044
	6. I believe that equine behaviour advisors know best for solving equine behaviour problems	-0.429	0.055
	7. Equine behaviour advisors should base their work upon an understanding of horse psychology	0.367[+]	0.089
	8. Equine behaviour advisors should teach owners how to understand their horse	0.345[+]	0.104
	9. Methods used by some equine behaviour advisors, such as positive reinforcement, are a kinder approach to training	0.466[+]	0.040
	10. Equine behaviour advisors work by forming strong bonds with the horse	0.660[+]	0.004

[+] indicates where Spearman's rank order correlation calculations were used, where transformations did not generate normally distributed data, instead of Pearson's product moment correlations.

To complete the construct spaces for the remaining cognitive variables interviews were conducted with an opportunistic sample of people involved in the horse industry (N = 19). The sample consisted of equine lecturers and students, riding school employees and clients and competition yard employees. This ensured a broad demographic of people in the horse industry and decreased the possibility that a dimension of the construct space was omitted. The interviews were conducted by asking participants to write comments on a piece of paper headed with an open question or a sentence that required completion. This method followed Oppenheim (1992) who suggests that the creation of scales should start with open questions that become closed as items are developed, he goes on to suggest that the sentence completion approach is a tool that can be used as a starting point for this process. As this research is novel there were no existing examples of sentence completion questions that could be applied to this research context. Therefore, a sentence completion question was created for each of the cognitive variables based on encouraging consideration of the perceptions that are associated with and factor into their definitions (Table 3.2).

Table 3.2 Questions that were posed to people in the horse industry regarding each of the cognitive variables whose construct spaces needed further development by means of interview, following the review of definitions and key words.

Cognitive Variable	*Question*
Self-efficacy of adhering to the advice / Extent that external barriers will prevent adherence to the advice	The things I envisage would stop me following advice from an equine behaviour advisor are…..
Subjective norms	In your experience, what is the general opinion of equine behaviour advisors?
Perceived benefit of adhering to the advice	What are the benefits to using an equine behaviour advisor?

Perceived severity of the horse's behaviour problem	A horse with a behaviour problem is a problem because….
Attribution of the horse's behaviour problem to own behaviour / Attribution of the horse's behaviour problem to external factors	In your opinion, what makes horses develop behaviour problems?
Attitude towards horse behaviour consultants	I believe equine behaviour advisors are…….

The key words sourced from the literature and the responses generated by the interviews for each cognitive variable were complied together as a mind-map that represented the variable's construct space. These completed the construct spaces of the cognitive variables *self-efficacy of adhering to the advice; extent that external barriers will prevent adherence to the advice: subjective norms*; *perceived benefit of adhering to the advice; perceived severity of the horse's behaviour problem*; *attribution of the horse's behaviour problem to external factors* and *attitude towards horse behaviour consultants*. Statements were created from these construct spaces to ensure that every dimension was covered.

Self-efficacy of adhering to the advice, *subjective norms* and *perceived benefit of adhering to the advice* required more than one item but had relatively small construct spaces in relation to other cognitive variables. This lessened the possibility of ambiguity within what statements would cover the construct space, leading to two items that clearly covered the entire construct space for each of these variables. The items for *Self-efficacy of adhering to the advice*, *subjective norms* and *perceived benefit of adhering to the advice* can be viewed in Table 3.1.

The interviews were also used an opportunity to clarify a term for horse behaviour consultants that had recognised meaning with the horse community. Participants were asked to give a term that they would use to describe a horse behaviour consultant. The terms *equine behaviourist* and *equine behaviour advisor* were put forward, however the latter was more frequently cited and, therefore, this term was used throughout the questionnaire.

3.1.3 Establishing construct validity

The validity of a construct is determined by whether it measures the variable it is intended to. Aiken (1997) highlights that validity is particularly important in psychological and social science research, as in this type of research the variables are often abstract and hard to define. Because of this, researchers must take care to ensure that their tools are measuring the intended variables. The deductive process (described above) to develop the items used here ensured that they used terms offered by horse owners and riders and so had a recognised meaning within the horse community. This contributed to the validity of the content of the items.

Aiken (1997) goes on to suggest that if the scores of individual items correlate with the total score for all of the items addressing a variable they have internal consistency, thus suggesting that they are valid measures of that variable. This approach is not without limitation as an indication of construct validity. Although the items may be shown to measure the same variable no information is provided to clarify what that variable is. However, again the use of a deductive process in the construction of the items used here ensured that they were valid correspondences of the target cognitive variables.

3.1.3.1 Internal consistency of cognitive variables containing three or more items

Where only one or two items made up a cognitive variable the need to establish internal consistency was considered superfluous. The test of internal consistency was reserved to further validate items of cognitive variables that had three or more, representing a broader construct space. The cognitive variables that had three or more items resulting from their construct space and, therefore, were subject to internal consistency analysis were *extent that external barriers will prevent adherence to the advice*; *perceived severity of the horse's behaviour problem*; *attribution of the horse's behaviour problem to external factors*; *attitude towards horse behaviour consultants*. The items for these cognitive variables were distributed to 20 participants of the target population in order to generate data that were used in the internal consistency analyses (descriptive statistics for these data: Appendix 1.1).

Cronbach's alpha can be used as a test for internal consistency, however, it is not suitable for scales containing less than ten items (Pallant, 2007). Consequently, this approach was only appropriate for testing the internal consistency of the variable *attitude towards horse behaviour consultants* and so, alternatively, Aiken's method was consistency used for all variables. Items for *extent that external barriers will prevent adherence to the advice*, *perceived severity of the horse's behaviour problem* and *attribution of the horse's behaviour problem to external factors* were correlated with their summated total score using bivariate, one-tailed Pearson's product-moment correlation analyses, and Spearman's rank order correlation calculations where data remained not normally distributed after transformations had been explored. For the variables *extent that external barriers will prevent adherence to the advice* and *perceived severity of the horse's behaviour problem* all items significantly correlated with the total score ($p \leq 0.01$) (Table 3.1). For the variable *attribution of the horse's behaviour problem to external factors* four out of five items correlated significantly with the total score ($p \leq 0.01$) (Table 3.1). However, item five was not discarded because it was

considered that this variable demonstrated a prominent component of the construct space, which should include all possible associated cognitions (Aiken, 1997), and the p value (p = 0.062) did not greatly exceed 0.05.

3.1.3.2 Inductive generation of items of attitude towards horse behaviour consultants

To make the questionnaire as small as possible (Oppenheim, 1992) the number of items for *attitude towards horse behaviour consultants* was reduced from twenty to ten items. Ten items was considered the smallest possible number to cover the entire construct space. The number of items was reduced in two stages. Firstly, selection of the items was based on the internal consistency analysis between the items and the variable's summated total score. The internal consistency analysis revealed that items three (p = 0.039), five (p = 0.045), twelve (p = 0.027), thirteen (p = 0.044), nineteen (p = 0.040) and twenty (p = 0.007) significantly correlated with the total score. These items were selected on that basis. Secondly, the items were correlated with one another using a bivariate, two-tailed Spearman's rank order correlation calculations (Appendix 1.3). Those items that correlated well with each other ($r \geq 0.6$) were considered to be measuring closely related elements of the construct space and were grouped together. To select the remaining four items, the item from each group that correlated best with the total score was identified and added to the final profile (where this item had been selected in stage one, the item with the second largest relationship with the total score was selected). Finally, the content of the selected items was further reviewed to ensure the whole construct space was measured. The resultant ten item attitude scale can be viewed in Table 3.1. The ten items that were not selected and the r values resulting from their correlation with the variable's total score can be viewed in Appendix 1.2. Factor analysis was not used to deduce the ten items due to the small sample size (N = 20).

The internal consistency analysis for the variable *attitude towards horse behaviour consultants* was also used to explore the direction of the relationship between the individual items and the total score for the variable. This was used to establish whether respondents interpreted items as worded positively or negatively.

The statements for each of the cognitive variables (Table 3.1) were presented with a seven point scale. The numerical scale was grounded by the terms strongly disagree at one and strongly agree at seven (Appendix 2.3). A mid-scale neutral point was available but was not defined in words. Not defining the neutral point was intended to encourage respondents to give greater consideration of their answer, thus aiding reliability (Page-Bucci, 2003), while providing an option for those respondents would may have been alienated by its absence. The success of this approach is reflected in the raw data, where there is minimal repetition of selecting the neutral point.

3.1.4 Measuring adherence to the advice of a horse behaviour consultant

Adherence can be measured in several ways including judgements made by the practitioner, objective assessments of the amount of medication used (i.e. pill counting), resolution of the ailment and self-reports by the client (Otsuki et al, 2009). In the context of horse behaviour consultancy, particularly where the communication is a larger scale demonstration, the consultants may not have the opportunity to contact the client after the event and make a judgement about how well they have adhered to their advice. Hence, this measure could not used consistently throughout this study. It was also unlikely that any medication would be used therefore providing no objective measure. Although adherence has an association with resolution of behaviour problems (Casey & Bradshaw, 2008) advice may be modified several times before the problem is resolved. Hence, initially adherence may not result in the resolution of the problem but continued adherence to modified advice may do. Within the time constraints of the study it is possible that the behaviour problem may not have been fully resolved, therefore to

use this as a measure of adherence may generate false negatives. In addition, resolution of the behaviour problem may be subjective and, therefore, would not be a true reflection of adherence. In conclusion, client self-reports were the only suitable measure.

The stages of change models can be used to identify where on a continuum of change a participant falls. The models often identify four stages of change, for example, pre-contemplation, contemplation, action and maintenance (Prochaska & DiClemente, 1984). The measure of adherence to advice of a horse behaviour consultant used in this research was based on the stages of change and aimed to identify how much behaviour change had occurred, thus to what extent participants were adhering to the advice given by the behaviour consultant.

The scale used to measure adherence (Appendix 2.4; Section 2; questions 1-4) was based on the University of Rhode Island Change Assessment Scale (URICA; 2007). The URICA is widely used in behaviour change research and provides general statements about participating in adaptive behaviour that can be modified and applied to a range of settings, for example, eating behaviour (Dunn et al, 2003), use of schizophrenia medication (Strong Kinnaman et al, 2007) and alcohol use (Heesch et al, 2005). An approach that does not ask about specific elements of a treatment programme is particularly useful in this research context where the advice is variable between participants.

The URICA uses Likert scales that respondents rate to demonstrate the amount that they are participating in each stage of change. Advantages of measuring adherence in this way include that participants can identify even small amounts of adherence, therefore, reducing the temptation to give false positives, which may have occurred should a single and absolute measure have been used. Additionally, the use of Likert scales also aided respondent comprehension by providing consistency throughout the questionnaire.

3.1.5 Recording the horse's behaviour problem

A subjective assessment made by the owner judges whether the actual behaviour displayed by the animal is a problem and the extent of the problem (Mills, 1999). Therefore, adherence may be affected not by the horse's behaviour per se but how much of a problem it is to the owner and, therefore, how much the owner wants to resolve it. This can only be measured by recording cognitive variables which include the thoughts and beliefs that a client associates with the behaviour, as opposed to the recording the actual behaviour. In response it was deemed unnecessary to quantifiably record the horse's behaviour problem, although participants were invited to give qualitative details if they wished.

3.1.6 Compilation and development of the questionnaire

The items for each cognitive variable and the dependent variable were compiled into a first draft of the questionnaire and piloted using an opportunistic sample of 11 members of the target population. During this pilot the participants were asked to comment on their interpretation of the items and the instructions detailing how to complete the questionnaire. They commented on the terms used and what key words and items they had expected to appear in an instrument measuring the target cognitive variables. Their comments were used to revise the wording of the items and further ensure that they had recognised meaning within the horse community, thus contributing further to content validity. Their comments were also used to refine the wording of the instructions to remove any ambiguity as to how to complete the questionnaire.

During the above process, the participants were asked to identify any items that they considered to be leading questions (questions that make assumptions), or included loaded words (words that may evoke an emotive response), discriminative questions or double negatives, all of which Oppenheim (1992) recommends avoiding. Where these were identified they were replaced with more neutral alternatives. Where the same alternatives

were suggested by several of the participants the questionnaire was revised to incorporate them. The participants were additionally asked to comment on font, line spacing, presentation and aesthetics of the questionnaire.

The revised questionnaire was distributed to a different opportunistic sample of eight members of the target population. Again participants were asked to comment on the elements discussed above. These comments gave rise to further revisions to wording of the items and instructions and format of the questionnaire. It was redistributed one further time to the entire sample of 19 and at this stage all participants agreed that it was fit for purpose.

Of the 19 people participating in the pilot the attitudes and perceptions of five of them were known to the researcher, having been voluntarily offered with informed consent during the interview stages. Where existing measures of a variable are not available the known opinions of the respondents can be used to assess criterion validity of a new measure (Aiken, 1997). By knowing the opinions of respondents the general direction in which items would be scored could be predicted. For example, those who were known to have a positive attitude towards horse behaviour consultants were expected to score high on the scale measuring *attitude towards horse behaviour consultants*. For each of these five participants the overall score for each of the cognitive variables reflected their known opinions, demonstrating the criterion validity of the scale.

In addition to the items measuring the cognitive variables the questionnaire asked for general information about the participant and their horse. These questions were designed to gather information about the demographics of the sample so that they could be compared with those of the wider horse owning community and used in secondary analyses. These questions were developed with advice from researchers whose target population is also horse owners (E. Creighton, personal communication, 2005; J. Hockenhull, personal communication, 2005) .

Finally, the questionnaire asked participants to indicate whether they were attending an individual consultation, group workshop or larger scale demonstration by circling the appropriate option on a list on the front of the questionnaire. These questions were designed to identify the type of communication the respondent attended and be used in analyses to establish whether different formats of communication brought about more adherence.

The full questionnaire and supporting material (introductory letter and consent form) can be viewed in Appendix 2.

3.2 Criterion validity of the self-reported responses

The fundamental design of this study was to gather self-reported responses from participants to measure cognitive variables. Although self-reported responses are the standard approach in social cognition research (e.g. Beaudoin & Fernandez, 2007, Booth- Butterfield & Reger, 2004; Frostholm et al, 2007; Hearty at el, 2007; Mausbach et al, 2007; Schroder et al, 2007) they have recognised limitations. The principle limitation is that the respondent may be intentionally or unintentionally deceitful (Aiken, 1996, Oppenheim, 1992). The survey was constructed using design features that aimed to reduce deception including the use of the stages of change approach to minimise false positive of adherence, the use of positive and negative statements and re-ordering items in subsequent questionnaires, all of which encouraged respondents to give more consideration to their answers, therefore encouraging more honest answers (Aiken, 1996; Oppenheim, 1992).

Validation of self-reported responses can be achieved for example with face-to-face interviews (Mausbach et al, 2007), telephone surveys (Beaudoin & Fernandez, 2007) and responses reviewed with participants at a later date (Hardy et al, 2007). The responses of this survey were validated by telephone interviews of 11 respondents who volunteered. The respondents who participated in this element of the research did so under informed

consent. Participants were invited to leave contact details and a random sample of those who obliged were contacted after they had submitted their first questionnaire.

A standardised set of questions was asked to each of these respondents (Table 3.3). The questions asked about a sample of the variables measured in the questionnaire. The questions acted as starting points to lead the interview which then became free-style in structure and because of this, information about other variables was often offered in addition. A small set of questions (four) was used in the final methodology because during early stages in the data collection, where the majority of items were discussed, the interviews became laborious and it was thought that this may reduce reliability (Oppenheim, 1992).

Table 3.3 Questions that related to cognitive variables measured by the questionnaire asked during telephone interviews to validate the self-reported responses.

Standardised questions to validate questionnaire responses
Do you believe that it is important for horse behaviour consultants to work with the horse and the owner?
Do you have concerns that the horse will not respond to the new things that you try?
Did you feel social pressure not to follow the advice of the horse behaviour consultant?
What do you feel contributed to….. (details of the specific horse, and its behaviour problem)

The responses given in the interviews were compared with those given in the questionnaire. The qualitative answers that were provided by the respondents during the interviews corresponded with the responses given in the questionnaire and, therefore, were considered to be truthful.

3.3 Ethics

Ethics concerns the consideration of moral issues (Broom, 2006). The British Psychological Society (BPS) and the Association for the Study of Animal Behaviour (ASAB) set clear guidelines regarding research ethics (ASAB, 2008; BPS, 2008). The guidelines set by ASAB focus on the use of animals within research (ASAB, 2008). However, because this research did not take any measures directly from animals and instead took measures from human participants, ethical guidance was sought from the BPS. The BPS states four ethical principles for practicing psychologists: respect, competence, responsibility and integrity (BPS, 2008). These principles are echoed in research methods guides (e.g. Cone & Foster, 2006; Denscombe, 2007) and formed the basis of ensuring that this research was ethically sound.

The issues of competence and integrity concern the recognition of one's ability and working to a high standard within it and the truthfulness of research findings presented. The competence of the work was ensured by communications with the research degree supervisor, appropriate academics, industry professionals acting as advisors and consulting textbooks and prior research. Complying with guidelines regarding plagiarism and falsification of data ensures the integrity of the research. Recognising the limitations of the study and refraining from making misleading claims also aides the integrity and competence of the work.

The issues of respect and responsibility regard ensuring that the rights of participants' are upheld and that they are protected from harm (Denscombe, 2007). Because the research entailed completion of a questionnaire only, the participants were not subjected to any physical harm by taking part in the

study. In the case of those participants who were contacted by email and completed the electronic version of the questionnaire (see section 3.5), health and safety risks regarding the use of computers were considered to be no different to that normally encountered by the participant.

The research did not directly manipulate participants' behaviour; rather it aimed to record it. However, it is recognised that partaking in the research may have caused the participants to give some consideration to their behaviour and actions towards their horses, and in some cases this may have resulted in some emotional stress. In justification of the ethical soundness of the research, this stress was considered to be no greater than that caused by participating in the horse behaviour consultancy process, which was undertaken by the participants in their ordinary life.

The absence of physical harm and deception within the research caused ethical issues to focus on informed consent and confidentiality. The questionnaires were distributed in packs which included a letter giving information about the research and inviting participation, along with a consent form. The letter and consent form were developed with guidance from Cone and Foster (2006), the BPS (2008) and examples from an active health psychology researcher (E. Whelen, personal communication, 2005). The letter contained the following information to ensure that the participants were appropriately informed: the purpose and objectives of the study; what was required of the participant and time scale; the benefit of taking part; a statement that participation was voluntary and that participants were free to withdraw at any time; reassurance that data were confidential and contact details of the researchers. The letter also contained details of where and when results would be published so that participants could be appropriately de-briefed. In addition, those participants who specifically asked for an overview of the findings were emailed.

The consent form asked participants to initial individual boxes to demonstrate their consent to five areas. These were: that they had read and understood the information sheet provided; that they understood that their participation

was voluntary and that they were free to withdraw at any time without giving reason; that they were willing to be contacted by telephone / email to discuss the completed questionnaires; that they agree to take part in the study and that they were willing to complete a third questionnaire of similar content as part of a three month follow up. A space was also provided for participants to give their name, sign and date the form.

Informed consent is not without limitations (e.g. Miller & Bell, 2002; Faden & Beauchamp, 1986). Miller and Bell (2002) discuss the issue of coercion when accessing research participants and this limitation may be applicable to this research. Where the horse behaviour consultants recruited clients their authority may have had a coercing effect on the decision to participate. The behaviour consultants where not put under undue pressure from the research team to recruit and along with the participants they were made aware of their freedom to withdraw from the project at any time. This may have reduced the possibility that any of the behaviour consultants intentionally coerced clients into participating. However, their authority may have unintentionally coerced clients to participate. This is a recognised limitation of all research of this nature (Miller & Bell, 2002). On the other hand, a conscious effort not to coerce clients to participate may have resulted in participants completing the first questionnaire but not completing the second and third, contributing to the low sample size.

Miller and Bell (2002) also propose that what the participant signs up for may change throughout the course of the research. In some cases the approach towards data collection may change due to factors such as achieving a large enough sample or shifts in deadlines (Miller & Bell, 2002). Again this was applicable to this research, as the need to prompt participants to return the second and third questionnaires led to a more instrumental approach towards data collection. In order to address this ethical concern all correspondences were presented sensitively and asked participants if they were still able to offer their time, thus allowing them to not comply if they wished to withdraw.

One final issue of informed consent applicable to this research is whether information had been understood (Kent, 1996). It is possible that where the researcher was not present information regarding the project was misunderstood. To minimise this risk, the information letter was piloted to ensure that enough information was provided and that it was accessible to horse owners.

With regard to personal details, only the participants' names and the contact details that they chose to leave were recorded. This information was provided on the consent forms which were stored with the questionnaires. The three questionnaires were matched using the responses to the questions titled 'Information about you and your horse' (see relevant section appendix 2.3). However, due to the need to prompt the completion of the second and third questionnaires, the questionnaires were stored with the consent forms so that correspondences and which sets of data were complete could be tracked. The files were stored in a locked filing cabinet within a locked room so that only the lead researcher had access to this information. The names and contact details of the participants were not used for any other means than to prompt the completion of the questionnaires. No information that identified a participant was used in corresponding literature or conversations. It was never made known to the researcher which horse behaviour consultant a participant had used.

No one was refused participation in the research. The questionnaire was designed with equal opportunities in mind and the pilot process aided in ensuring that it did not include discriminative barriers that alienated people because of religion, age or sex. The study was conducted in the UK and Ireland and all the behaviour consultants were English speaking. This reduced the possibility that language presented a barrier to participating. However, it is possible that some potential participants did not partake in the project due to this or other literacy related issues. The researcher was not informed of any participants who were visually impaired, although the requirements of such participants would have been met if required.

A proposal was approved by the University of Chester's Department of Psychology's ethical committee.

3.4 Sample

The findings were derived from an opportunistic sample of horse owners with the specific characteristic of being in search of advice on horse behaviour. The sample of participants in the study was not intended to be representative of all horse owners in general, but this sub-set of the population only. Data were collected from the clients of 18 horse behaviour consultants practising in the UK. Behaviour consultants were found through internet searches, counsellor lists from the APBC and ASAB, word of mouth and by networking at academic conferences and horse events.

Behaviour consultants were contacted by email and telephone. A standard email was used to introduce the project and invite interest (Appendix 3.1) and the same information was given over the telephone in those circumstances. Further correspondences were then made until all parties were happy with what participation entailed and had agreed to take part.

The behaviour consultants were sent the requested number of packs, which contained a letter detailing the project, a consent form, two questionnaires (the third questionnaire was sent later in the data collection) and a stamped addressed envelope per questionnaire. The behaviour consultants distributed these to their clients. All behaviour consultants were contacted at approximately three month intervals to update them on the project's progress, ask for feedback and establish whether more survey packs were required to be sent. The strategy that generated the most data was to ask the largest possible number of behaviour consultants to distribute to three or four clients, as opposed to relying on a smaller number of consultants to distribute to large numbers of clients.

A second recruitment strategy involved contacting all British Horse Society riding clubs in the UK with websites. A standard email was sent to all clubs introducing the project and asking whether the club or its members that were planning a behaviour focused event and were able to help (Appendix 3.2). The clubs disseminated the information at meetings and on website posts. This led to several individuals who were planning on using a horse behaviour consultant contacting the researcher and offering their participation. Several clubs also welcomed data collection at behaviour events that they had organised. Survey packs were either sent directly to the participant, or the requested number was sent to the event organiser. In some cases the lead researcher attended the event and invited attendees to participate and distributed packs in person. This was the preferred strategy but was not always possible and where the lead researcher was unable to attend the event organiser distributed the packs to those willing to participate.

As a third method of reaching the target population the internet and equine press were used to identify suitable behaviour events taking place in the UK. The event organisers were contacted by email or telephone with a standard script introducing the project and asking whether they felt it would be suitable to collect data at the event. This led to several data collection opportunities. Again survey packs were sent to the event organiser who distributed them, or where possible the lead researcher attended.

The conclusions drawn in subsequent chapters are valid only for horse owners seeking advice on horse behaviour, however, this is appropriate as the aims relate to applying the findings to this sub-set population only. There was potential for participants to be a biased sample of this sub-set population due to the self-selected nature of agreeing to participate, thus affecting the generalisability of the findings. This is a limitation of all social science and psychological research where participants opt in with informed consent. Mann-Whitney U tests revealed no significant difference between the total scores of the cognitive variables (measured in the first questionnaire) between the respondents who completed the first questionnaire only and the respondents who went on to complete subsequent questionnaires (Table 3.4).

This suggests that the respondents who participated fully in the research were not a bias sample of the population who demonstrated an interest in the research, although, it is possible that there was bias in the type of person who opted to have any involvement in the first place.

The small size of the horse behaviour consultancy industry meant that all opportunities to gather data were saturated over the period of data collection. In addition, strategies (discussed later) were employed to ensure the largest possible response rate, however, ultimately the final sample size was modest (N = 52). Cohen (1988) suggested that where an alpha value of 0.05 and a power of 0.80 are used (as is generally accepted as standard) a moderate effect size would be detected with a sample size of 45 to 55 respondents. Although a larger sample size would have been preferable the actual sample did satisfy these suggestions.

Table 3.4 Difference between median scores of the cognitive variables for respondents who completed the first questionnaire only and the respondents who went on to complete subsequent questionnaires.

Variable	*Median scores*		*Z*	*P*
	Completed the 1st questionnaire only	Completed the 1st and subsequent questionnaires		
Attribution of the horse's behaviour problem to own behaviour	4.0	4.0	0.233	0.816
Attribution of the horse's behaviour problem to external factors	15.0	15.0	0.786	0.432
Value of the outcome of adhering to the advice	7.0	7.0	0.597	0.551
Self-efficacy of adhering to the advice	12.0	10.0	1.309	0.191
Extent that external barriers will prevent adherence to the advice	17.0	15.0	0.488	0.625
Perceived susceptibility of the horse developing a behaviour problem	4.0	3.0	0.345	0.730
Perceived severity of the horse's behaviour problem	12.0	13.0	0.829	0.407
Perceived benefit of adhering to the advice	12.0	12.0	0.135	0.892
Attitude towards horse behaviour consultants	47.0	48.0	0.348	0.728
Subjective norms	5.0	5.0	1.581	0.114

3.5 Procedure

The horse behaviour consultants were located and practising across the UK and Ireland and consultations occurred simultaneously, hence the researcher's presence at all data collection opportunities was impractical. In addition, to generate cooperation with the study impositions on the horse behaviour consultant's time was avoided and, therefore, they were not asked to collect the data in person by conducting the questionnaire with the client. For these reasons, postal and electronic surveys were considered as suitable approaches. Pilot discussions with the target population revealed that some would feel alienated by an electronic survey. In addition, the need to complete the first questionnaire before the communication was better addressed by having hard copies that could be handed out at the communication.

As the horse behaviour consultants distributed the survey packs the total number distributed was unknown to the researcher. The horse behaviour consultants were not asked to report the number of packs they distributed because it was considered that this would put undue pressure on them to gain responses. Should the consultants have been exposed to such pressure it may have been passed onto participants and potentially become unethical coercion. Additionally, it was felt that pressure to distribute survey packs and take time to record the distribution may result in the consultants withdrawing from the study, however, the total number distributed to the consultants was recorded and totalled 175.

In order to answer the research aims the questionnaire was required to be completed before the communication, ten days after and at three months later. The time scales were designed to measure the cognitive variables before receiving the advice, and, along with adherence, immediately after receiving the advice and as a longer term follow up. Discussions with horse behaviour consultants provided the time scales and these were based on how long they felt it took clients to process the information, begin adhering to

it and the amount of time that they allowed before conducting follow up correspondences.

Participants were provided with a survey pack (Appendix 2) either sent to them before they attended a consultation or event (by the behaviour consultant, the event organiser or the lead researcher), or given to them at the start of the consultation or event. Participants were supplied with the first two questionnaires within this survey pack. They completed the first (pre-communication) questionnaire before the start of the event and they completed the second (post-communication) questionnaire around ten days after the event. Participants returned the questionnaires using the stamped addressed envelopes provided. Those who left contact details were contacted either by email or telephone and invited to complete the third (follow up) questionnaire when three months had passed.

Distributing the questionnaires in hard copies exposed it to being lost by participants. In part, this strategy resulted in a low return rate of the second and third questionnaires. It was considered that this was possibly due to a lack of communication between the researcher and participant. To increase the return rate of the post-communication questionnaire, all participants were contacted by email or telephone once the pre-communication questionnaire had been received to thank them and remind them to complete the remaining parts of the study. A further element of the new strategy was to attach an electronic version of the post-communication questionnaire – which allowed them to click and drag a circle over their chosen score on the Likert scale – to all of the above email correspondences. This strategy dramatically increased the number of completed responses.

To increase the number of follow up questionnaires that were completed, the information letter provided was changed to incorporate this questionnaire as an obligatory part of the research (Appendix 2.6) and a third questionnaire was provided in all packs. To further increase the number that were completed and increase the number that were returned, participants were contacted after receiving their completed post-communication questionnaire

to thank them and remind them to complete the follow up questionnaire. Participants were then contacted a further time at three months after receiving the post-communication questionnaire, to further remind them to complete the follow up questionnaire. As above, an electronic version of the follow up questionnaire was attached to all email correspondences. Again, this strategy increased the number of completed responses.

3.6 Data handling

3.6.1 Input of data

The Likert scale score for every positively worded item on the questionnaire, measuring the cognitive (independent) variables and the degree of adherence to the advice of a horse behaviour consultant (dependent variable), for each participant was inputted into SPSS, version 14. The scores for the negatively worded items were reversed[1]. The demographical data and the type of communication that was attended were entered as categorical variables.

3.6.2 Manipulation of raw data

The majority of the cognitive variables' total scores were calculated as the summated scores for the items representing that variable. Scores for the four items measuring adherence (Appendix 2.4; Section 2; questions 1-4) were also summated to give a total score. Scores were summed to retain data that may be lost when rounding up averages; this method is also consistent with the application of social cognition models (e.g. Francis et al, 2004; URICA, 2007). Missing values were taken account of using the

[1] *Attitude towards horse behaviour consultants* item six (Table 3.1), *self-efficacy of adhering to the advice of a horse behaviour consultant* item two (Table 3.1), *subjective norms* item two and *perceived susceptibility of the horse developing a behavioural problem* item one (Table 3.1) were negatively worded.

formula below. This formula viewed the actual score as a percentage of the possible maximum score for each item completed within each cognitive variable. It was assumed that the same percentage would be found should all of the Likert scales have been completed. Missing data were corrected in this way so that the maximum amount of data could be derived from the sample.

Actual score / Total possible score from items completed	X	Total possible if all items were completed	=	Amended total score

The total score for the variable *subjective norms* was derived by multiplying the score for item one, which measured the extent that they felt using a horse behaviour consultant was the norm, by item two, which measured the extent that they felt motivated to comply with the norm (Francis et al, 2004).

3.6.3 Assessment for colinearity between items of the same cognitive variable and between the total scores of the cognitive variables

Where cognitive variables contained three or more items, the items for that variable were correlated with one another using bivariate, two-tailed Spearman's rank order correlation calculations. Data from the pre-communication questionnaire were analysed as these data provided the largest sample size (N = 52). None of the calculations revealed $r \geq 0.80$ (Appendix 4.1, 4.2, 4.3, 4.4). Therefore, none of the items were considered to be strongly correlated and so measuring the same element of the construct space as another for that respective variable (Pallant, 2007). Therefore, all items were included in calculations to ascertain a total score for each of the cognitive variables. Additionally, the relationship between the total scores for each of the cognitive variables was examined using bivariate, two-tailed, Spearmen's rank order correlation calculations (Appendix 4.5). None of the calculations revealed $\geq r 0.80$, therefore the variables were considered be absent of colinearity.

The amount of immediate change in each of the cognitive variables between the pre-communication and the post-communication questionnaires, and the amount of longer term change in each of the cognitive variables between the pre-communication and follow up questionnaire was also calculated.

3.6.4 Statistical analyses

One-way, between-groups, ANOVA were conducted to explore the impact of the three types of communication and the demographic variables on adherence to the advice of a horse behaviour consultant.

To establish whether each of the cognitive variables had an association with adherence to the advice of a horse behaviour consultant data were analysed using bivariate correlation analyses. There was no guidance from past literature regarding this specific research context, therefore, to exercise caution two-tailed calculations were used in these analyses.

This research did not set out to test specific hypotheses concerning each of the cognitive variables, but rather explore potential relationships between each variable and adherence to the advice of a horse behaviour consultant. Where multiple analyses are used to explore relationships rather than confirm them it is acceptable to negate the use of adjustments to the value of α (Martin & Bateson, 1993), therefore α of 0.05 was retained for these analyses. However, the conclusions drawn from these analyses may only be viewed as preliminary suggestions on which to base recommendations and further research.

The ANOVA and correlation analyses screened for those variables that had associations or significant effects on adherence. Multiple regression analyses were then used to generate a model consisting of those variables that had a moderate and significant relationship ($r \geq 0.4$, $p = 0.01$) with adherence to the advice of a horse behaviour consultant (Field, 2000). The

model was used to explore the amount of variance explained by these variables and any interaction effects between them.

CHAPTER 4

Results

4.1 Demographics of respondents

As distribution of the survey was carried out mainly by the horse behaviour consultants, it was unknown to the researcher precisely how many were given out. This made it impossible to calculate the overall response rate. However, 37.3% of the participants who returned the pre-communication questionnaire went on to return both the post-communication and follow up questionnaires, 22.4% of the participants who returned the pre-communication questionnaire went on to return the post-communication questionnaire only, and 16.4% of participants who returned the pre-communication questionnaire went on to return only the follow up questionnaire (over-all N = 52).

Excluding missing data, 96% of the respondents were female (N = 50). The majority of the respondents classified themselves in the two age bands 31-40 years old and 41-50 years old (Figure 4.1).

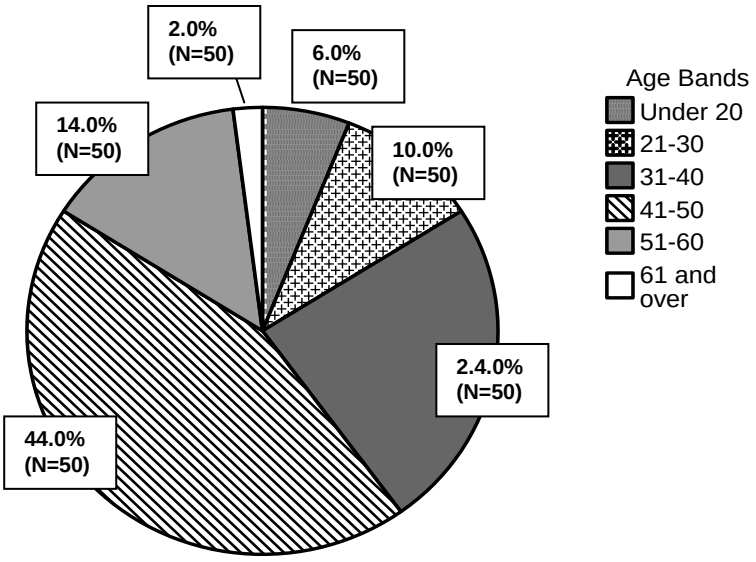


Figure 4.1 Percentages of respondents in each age band (N = 50).

Almost all of the respondents classified themselves as leisure riders or committed amateurs, with only 3.9% categorising themselves as professional (excluding missing data) (Figure 4.2).

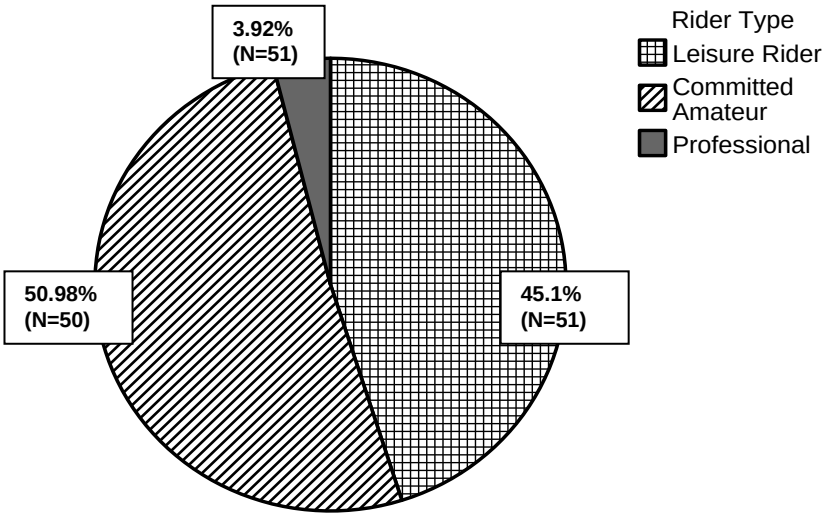


Figure 4.2 Percentages of respondents in each category of rider type (N = 51).

The majority of the respondents categorised themselves as having an intermediate level of skill (Figure 4.3).

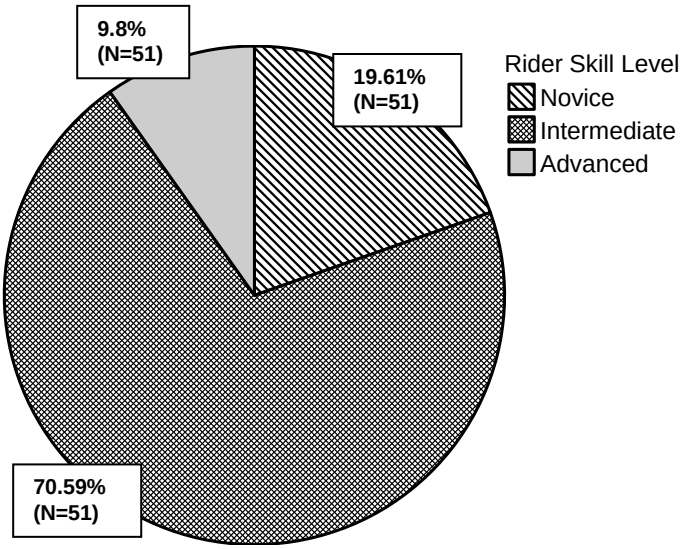


Figure 4.3 Percentages of respondents in each category of rider skill (N = 51).

4.2 The effect of owner gender, age, rider type and level of skill on adherence to the advice of a horse behaviour consultant

No statistically significant difference was shown between the male and female respondents in scores for adherence to the advice of a horse behaviour consultant ten days after the communication $F_{1, 36} = 0.077$ $p = 0.783$, or at three months after the communication $F_{1, 34} = 2.848$ $p = 0.101$ (Appendix 5.1).

No statistically significant difference was shown between the owner age groups in scores for adherence to the advice of the horse behaviour consultant ten days after the communication $F_{5,32} = 0.502$, $p = 0.773$, or at three months after the communication $F_{5,31} = 0.559$, $p = 0.730$ (Appendix 5.2).

No statistically significant difference was shown between the type of rider in scores for adherence to the advice of the horse behaviour consultant ten days after the communication $F_{2,34} = 0.182$, $p = 0.834$, or at three months after the communication $F_{2,36} = 0.014$, $p= 0.986$ (Appendix 5.3).

No statistically significant difference was shown between the riders' level of skill in scores for adherence to the advice of the horse behaviour consultant ten days after the communication $F_{2,34} = 0.103$, $p = 0.903$, or at three months after the communication $F_{2,36} = 0.615$, $p = 0.546$ (Appendix 5.4).

4.3 Effectiveness of different types of communication at bringing about adherence to the advice of a horse behaviour consultant

The majority of respondents categorised themselves as having attended a workshop (Figure 4.4). No statistically significant difference was shown between the groups in scores for adherence to the advice of the horse behaviour consultant ten days after the consultation $F_{2,36}$ =0 .933, p = 0.403, or at three months after the communication $F_{2,36}$ = 1.187, p = 0.318 (Appendix 5.5).

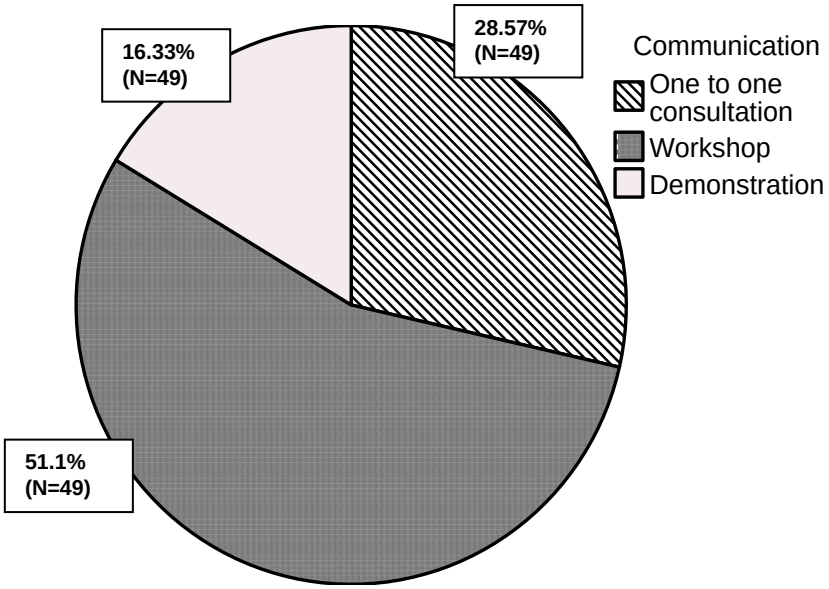


Figure 4.4 Percentages of respondents that took part in each type of communication (N = 49).

4.4 Descriptive Statistics

Standard deviations for the cognitive variables ranged from 0.43 to 13.27 (Table 4.1). Transformations were applied to each of the variables to allow for the use of parametric statistics. Where the data remained not normally distributed after transformations were applied nonparametric statistics were used (as highlighted in tables and figures).

Table 4.1 Descriptive statistics for data used in analyses to establish the research aims.

Cognitive variable	*mean*	*+/-SD*	*Kolmogorov -Smirnov*	*p*
Pre-communication				
Attitude towards horse behaviour consultants	46.00	8.33	0.186	0.047
Extent that external barriers will prevent adherence to the advice	15.36	5.35	0.163	0.131
Self-efficacy of adhering to the advice	10.95	2.33	0.173	0.087
Subjective norms	5.54	4.07	0.188	0.041
Attribution of the horse's behaviour problem to external factors	16.95	6.51	0.137	0.200
Attribution of the horse's behaviour problem to own behaviour	4.18	1.70	0.139	0.200
Perceived severity of the horse's behaviour problem	13.22	4.13	0.152	0.200
Perceived benefit of adhering to the advice	11.54	2.01	0.161	0.144
Value of the outcome of adhering to the advice	6.54	0.80	0.397	0.000
Perceived susceptibility of the horse developing a behaviour problem	3.27	1.72	0.179	0.065
Post-communication minus pre-communication (immediate change)				
Attitude towards horse behaviour consultants	-0.22	4.40	0.110	0.200

Extent that external barriers will prevent adherence to the advice	*-1.81*	*4.51*	*0.132*	*0.200*
Self-efficacy of adhering to the advice	-0.59	2.19	0.144	0.200
Subjective norms	0.50	2.98	0.297	0.000
Attribution of the horse's behaviour problem to external factors	-1.95	4.99	0.152	0.200
Attribution of the horse's behaviour problem to own behaviour	0.27	1.48	0.176	0.075
Perceived severity of the horse's behaviour problem	-2.18	3.63	0.135	0.200
Perceived benefit of adhering to the advice	-0.09	2.54	0.168	0.110
Value of the outcome of adhering to the advice	0.00	0.43	0.409	0.000
Perceived susceptibility of the horse developing a behaviour problem	0.03	1.84	0.233	0.001
Follow up minus pre-communication (longer term change)				
Attitude towards horse behaviour consultants	-.363	6.09	0.109	0.200
Extent that external barriers will prevent adherence to the advice	-1.77	6.00	0.101	0.200
Self-efficacy of adhering to the advice	-0.63	2.64	0.173	0.087
Subjective norms	13.04	13.27	0.227	0.004
Attribution of the horse's behaviour problem to external factors	-4.27	5.82	0.111	0.200
Attribution of the horse's behaviour problem to own behaviour	0.13	2.27	0.203	0.018
Perceived severity of the horse's behaviour problem	-1.54	4.77	0.280	0.000
Perceived benefit of adhering to the advice	-0.09	2.65	0.184	0.051
Value of the outcome of adhering to the advice	-0.04	1.04	0.301	0.000
Perceived susceptibility of the horse developing a behaviour problem	0.07	1.59	0.148	0.133
Adherence to the advice of a horse behaviour consultant two weeks after the communication	19.95	4.00	0.150	0.200
Adherence to the advice of a horse behaviour consultant three months after the communication	18.31	5.37	0.127	0.200

4.5 Pre-communication predictors of adherence to the advice of a horse behaviour consultant ten days after the communication

There was a significant, weak and negative correlation between *attribution of the horse's behaviour problem to external factors* and adherence to the advice of a horse behaviour consultant ten days after the communication (Figure 4.5; Table 4.2; Appendix 5.6). Those respondents who came into the process attributing their horse's behaviour problem to external factors demonstrated less adherence to the advice than those who attributed their horse's behaviour problem less to external factors.

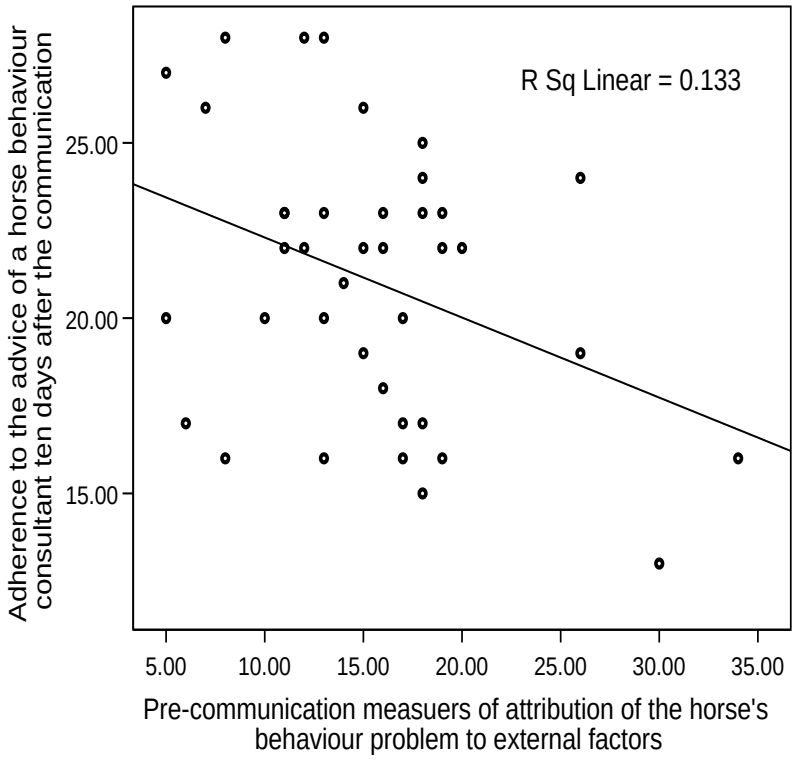


Figure 4.5 Relationship between pre-communication measures of *attribution of the horse's behaviour problem to external factors* and adherence ten days after the communication (r = 0.316, p = 0.050, N = 39).

There was a weak, positive none significant trend between *attitude towards horse behaviour consultants* and o the advice of a horse behaviour consultant ten days after the communication (Figure 4.6; Table 4.2; Appendix 5.6).

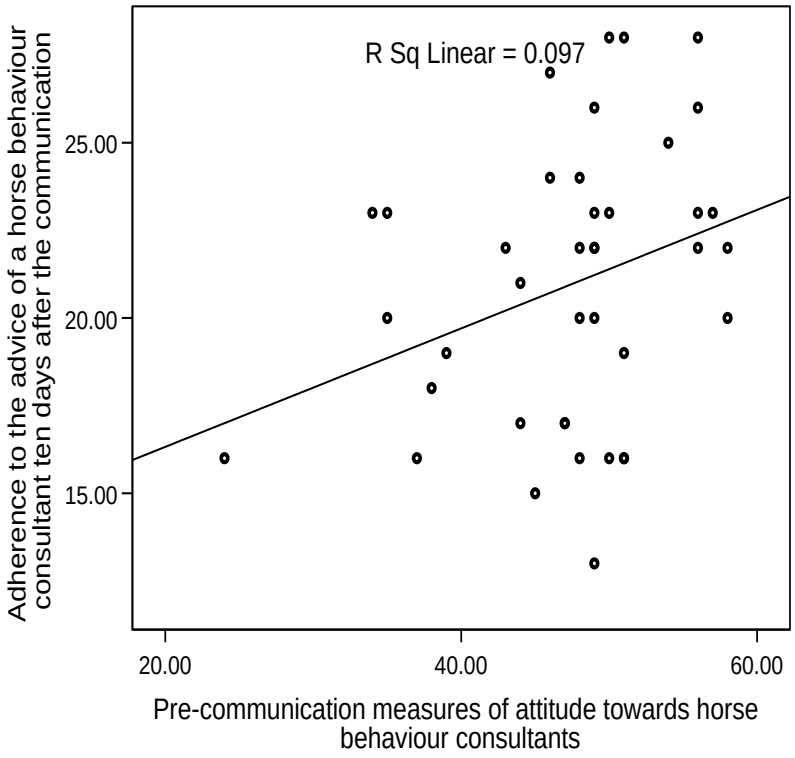


Figure 4.6 Relationship between pre-communication measures of *attitude towards horse behaviour consultants* and adherence days after the communication (r = 0.292, p = 0.068, N = 40).

Pre-communication measures of the remaining cognitive variables showed no associations with adherence to the advice of a horse behaviour consultant ten days after the communication (Table 4.2; Appendix 5.6).

Table 4.2 Relationship between pre-communication measures of the cognitive variables and adherence to the advice of a horse behaviour consultant ten days after the communication and three months after the communication.

Pre-communication measures	*Adherence at ten days*		*Adherence at three months*	
	r	*p*	*r*	*p*
Attribution of the horse's behaviour problem to own behaviour	-0.013	0.938	-0.039	0.820
Attribution of the horse's behaviour problem to external factors	-0.316	0.050	0.100	0.562
Self-efficacy of adhering to the advice	-0.049	0.810	0.012	0.946
Extent that external barriers will prevent adherence to the advice	-0.097	0.540	-0.247	0.146
Value of the outcome of adhering to the advice	-0.054[+]	0.742	0.220[+]	0.190
Perceived susceptibility of the horse developing a behaviour problem	-0.150	0.178	-0.190	0.276
Perceived severity of the horse's behaviour problem	-0.148	0.356	-0.007	0.968
Perceived benefit of adhering to the advice	0.049	0.762	0.289	0.088
Attitude towards horse behaviour consultants	0.292[+]	0.068	0.110[+]	0.516
Subjective norms	0.043[+]	0.792	-0.042[+]	0.808

[+] indicates Spearman's rank order correlation calculations instead of Pearson's product moment correlations.

4.6 Pre-communication predictors of adherence to the advice of a horse behaviour consultant three months after the communication

There was a weak, positive non significant trend between *perceived benefit of adhering to the advice* and adherence to the advice of a horse behaviour consultant three months after the communication (Table 4.2; Figure 4.7; Appendix 5.6). Those respondents who came into the process perceiving that they would benefit from the advice demonstrated more adherence to the advice than those who perceived that they would not benefit from it.

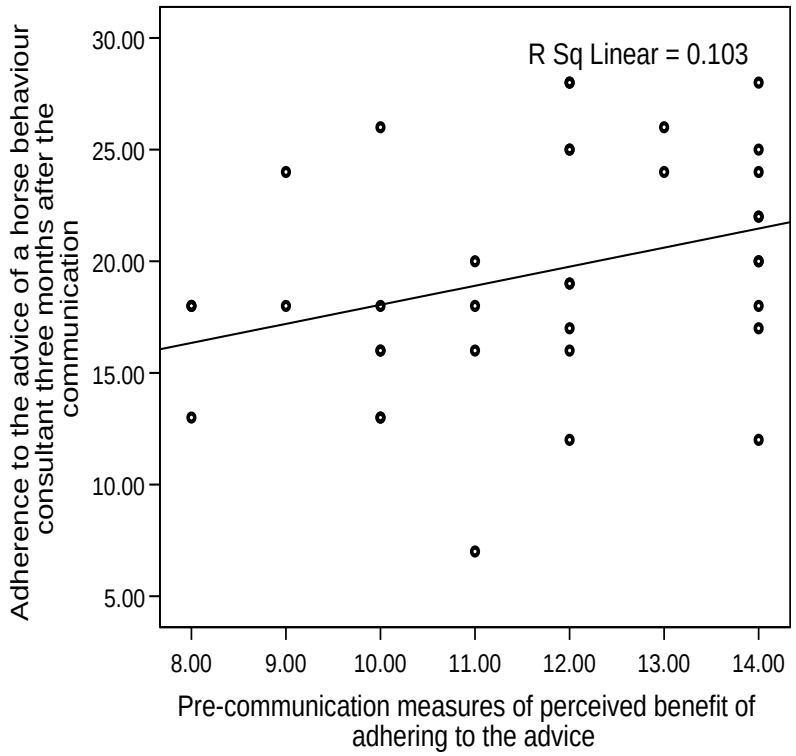


Figure 4.7 Relationship between pre-communication measures of *perceived benefit of adhering to the advice* and adherence three months after the communication (r = 0.289, p = 0.088, N = 36).

pre-communication measures of the remaining cognitive variables showed no associations with adherence to the advice of a horse behaviour consultant three months after the communication (Table 4.2; Appendix 5.6).

4.7 Immediate change in cognitive variables as predictors of adherence to the advice of a horse behaviour consultant ten days after the communication

The amount of immediate change in the cognitive variables was calculated by subtracting the pre-communication score from the post-communication score. There was a significant, moderate and positive correlation between the amount of immediate change in *value of the outcome of adhering to the advice* and adherence to the advice of a horse behaviour consultant ten days after the communication (Figure 4.8; Table 4.3; Appendix 5.7). Those respondents who changed towards an increased value of the outcome of adhering to the advice demonstrated more adherence to the advice than those that changed to value the outcome less.

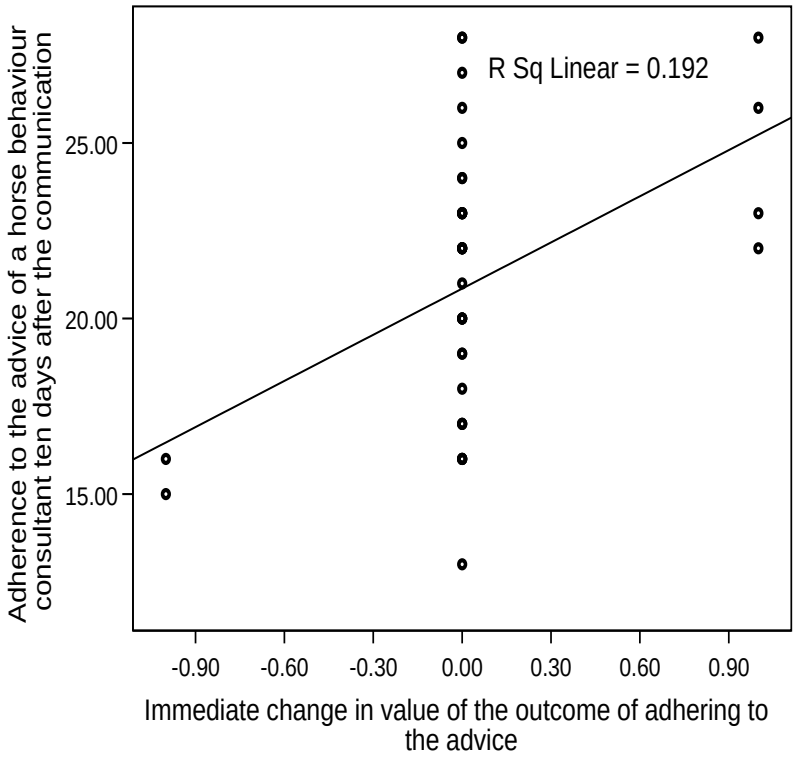


Figure 4.8 Relationship between the immediate change in *value of the outcome of adhering to the advice* and adherence ten days after the communication (r = 0.437, p = 0.003, N = 39).

There was a significant, moderate and positive correlation between the amount of immediate change in *attribution of the horse's behaviour problem to external factors* and adherence to the advice of a horse behaviour consultant ten days after the communication (Figure 4.9; Table 4.3; Appendix 5.7). Those respondents who changed towards attributing their horse's behaviour problem to external factors demonstrated more adherence to the advice than those who changed towards attributing their horse's behaviour problem less to external factors.

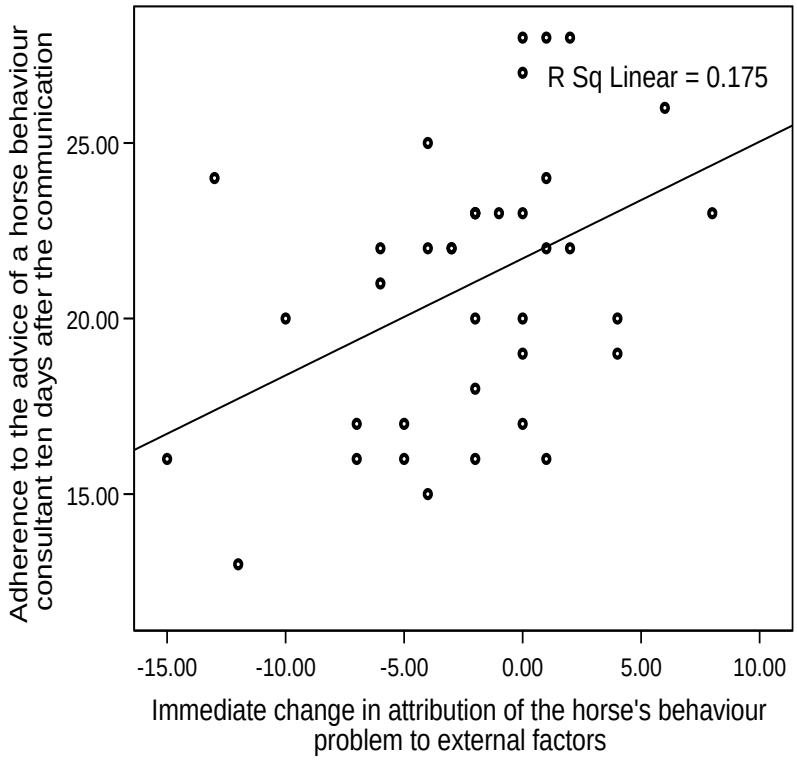


Figure 4.9 Relationship between the immediate change in *attribution of the horse's behaviour problem to external factors* and adherence ten days after the communication (r = 0.418, 0.009, N = 38).

The immediate change in the remaining cognitive variables showed no significant association with adherence to the advice of a horse behaviour consultant ten days after the communication (Table 4.3; Appendix 5.7).

Table 4.3 Relationship between the amount of immediate change in the cognitive variables and adherence to the advice of a horse behaviour consultant ten days after the communication and three months after the communication.

Immediate change	*Adherence at ten days*		*Adherence at three month*	
	r	*p*	*r*	*p*
Attribution of the horse's behaviour problem to own behaviour	-0.066	0.689	0.251	0.226
Attribution of the horse's behaviour problem to external factors	0.418	0.009	0.089	0.681
Self-efficacy of adhering to the advice	0.270	0.096	-0.181	0.386
Extent that external barriers will prevent adherence to the advice	0.072	0.662	0.309	0.132
Value of the outcome of adhering to the advice	0.437[+]	0.005	0.279[+]	0.178
Perceived susceptibility of the horse developing a behaviour problem	-0.191[+]	0.238	-0.148[+]	0.471
Perceived severity of the horse's behaviour problem	0.196	0.232	0.114	0.588
Perceived benefit of adhering to the advice	0.222	0.175	-0.185	0.376
Attitude towards horse behaviour consultants	-0.023	0.888	-0.057	0.780
Subjective norms	-0.270[+]	0.096	0.271[+]	0.190

[+] indicates Spearman's rank order correlation calculations instead of Pearson's product moment correlations.

4.8 Immediate change in cognitive variables as predictors of adherence to the advice of a horse behaviour consultant three months after the communication

The immediate change in any of the cognitive variables did not show a significant correlation with adherence to the advice of a horse behaviour consultant three months after the communication (Table 4.3; Appendix 5.7).

4.9 Longer term change in cognitive variables as predictors of adherence to the advice of a horse behaviour consultant three months after the communication

The amount of longer term change in the cognitive variables was calculated by subtracting the pre-communication score from the follow up score. There was a significant, moderate and positive correlation between the amount of longer term change in *attitude towards horse behaviour consultants* and adherence to the advice of a horse behaviour consultant three months after the communication (Table 4.4; Figure 4.10; Appendix 5.7). Those respondents that changed towards a positive attitude towards horse behaviour consultants demonstrated more adherence to the advice than those that changed to have a less positive attitude towards horse behaviour consultants.

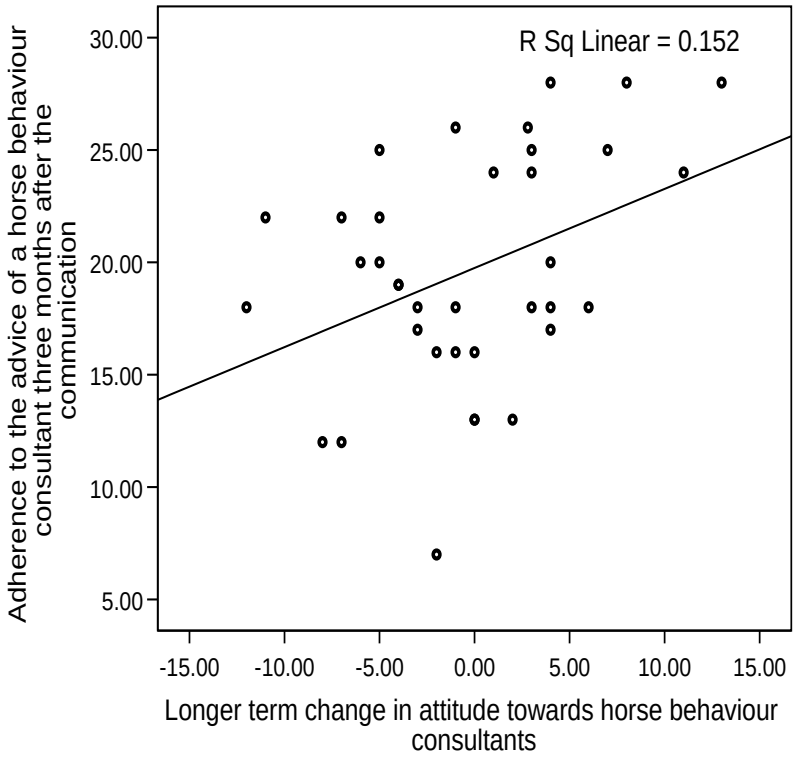


Figure 4.10 Relationship between the longer term change in *attitude towards horse behaviour consultants* and adherence three months after the communication (r = 0.389, p = 0.019, N = 36).

There was a small and positive trend between *perceived susceptibility of the horse developing a behaviour problem* and adherence to the advice of a horse behaviour consultant three months after the communication (Table 4.2; Figure 4.11; Appendix 5.7).

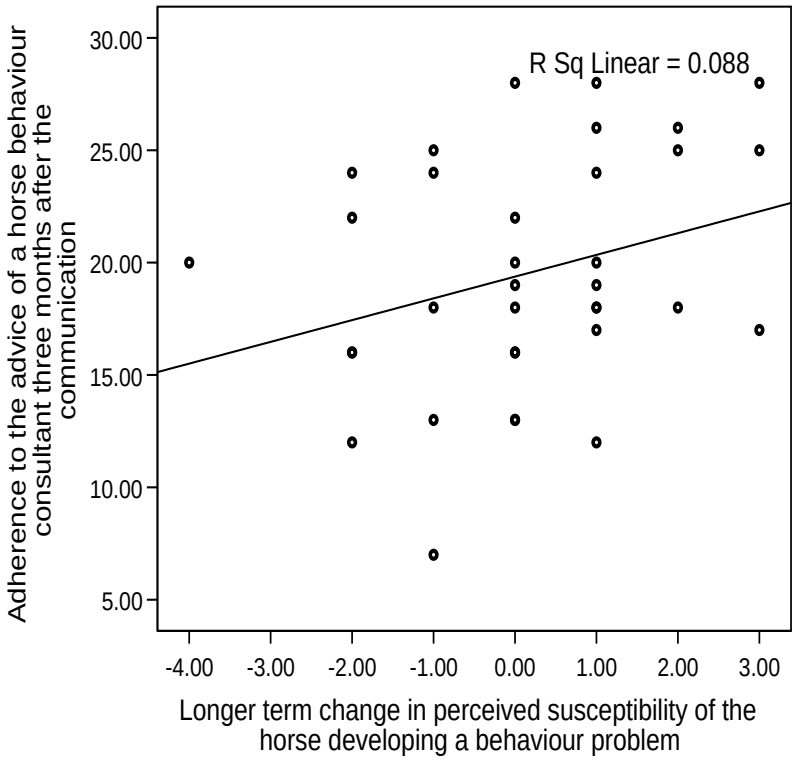


Figure 4.11 Relationship between the longer term change in *perceived susceptibility of the horse developing a behaviour problem* and adherence three months after the communication (r = 0.297, p = 0.083, N = 35).

The longer term change in the remaining cognitive variables showed no significant association with adherence to the advice of a horse behaviour consultant ten days after the communication (Table 4.4; Appendix 5.7).

Table 4.4 Relationship between the amount of longer term change in the cognitive variables and adherence to the advice of a horse behaviour consultant three months after the communication.

Longer term change	*Adherence at three months*	
	r	*p*
Attribution of the horse's behaviour problem to own behaviour	0.257[+]	0.136
Attribution of the horse's behaviour problem to external factors	0.290	0.097
Self-efficacy of adhering to the advice	-0.149	0.386
Extent that external barriers will prevent adherence to the advice	0.258	0.129
Value of outcome of adhering to the advice	-0.023[+]	0.896
Perceived susceptibility of the horse developing a behaviour problem	0.297	0.083
Perceived severity of the horse's behaviour problem	0.172[+]	0.324
Perceived benefit of adhering to the advice	0.039	0.819
Attitude towards horse behaviour consultants	0.389	0.019
Subjective norms	0.271[+]	0.190

[+] indicates Spearman's rank order correlation calculations instead of Pearson's product moment correlations.

4.10 Multiple regression analyses

Hierarchical multiple regression was used to assess the ability of the amount of immediate change in *value of the outcome of adhering to the advice*, and the amount of immediate change in *attribution of the horse's behaviour problem to external factors* to predict adherence ten days after the communication, after controlling for the influence of their interaction term generated by calculating their product (Jaccard & Turrisi, 2003). Step one explained 23.6% of the variance, and emerged as a significant model ($F_{2,35}$= 6.700, p = 0.003; Appendix 5.8). Both predictor variables were statistically significant, with the amount of immediate change in value *of the outcome of adhering to the advice* recording a higher beta value (beta = 0.338, p = 0.033), than the amount of immediate change in *attribution of the horse's behaviour problem to external factors* (beta = 0.309, p = 0.050). The amount of change that occurred once the interaction term was entered into the model at step two was not significant (R Square Change = 0.005, F Change = 0.224, p = 0.639; Appendix 5.8), indicating that there is there is no interaction effect between these two variables. This suggests that the extent that change in *value of the outcome of adhering to the advice* is associated with adherence is not moderated by change in *attribution of the horse's behaviour problem to external factors*.

As *attitude towards horse behaviour consultants* was the only cognitive variable to have a significant association with adherence three months after the communication, no multiple regression analyses were performed for this dependant variable.

CHAPTER 5

Discussion

The literature review reported in Chapter Two satisfied the first aim of this research and established a list of cognitive variables that had the potential to predict adherence to the advice of a horse behaviour consultant. Methodology adapted from health psychology was designed to measure those variables (Chapter Three) and satisfied the second aim by exploring each of their relationships with adherence (Chapter Four). The third aim was satisfied by exploring the impact of the type of communication and owner's' demographics on adherence (Chapter Four). Here conclusions that can be drawn from the findings are explored and subsequently the fourth aim of developing recommendations is satisfied

The sample was derived from horse owners seeking advice on horse behaviour and while their demographics did not differ from the general horse owning population (e.g. BETA, 2006; Hockenhull & Creighton, unpublished; Hotchkiss et al, 2007), the findings are only applicable to this sub-set population.

There were no statistically significant differences found between the gender of the owner or the categories of rider age, rider type or level of rider skill in scores for adherence ten days after the communication, or three months after the communication. Similarly, there were no statistically significant differences between the types of communication and adherence ten days after the communication, or three months after the communication. This suggests that the gender, age, experience and skill of the owner did not affect the degree to which they adhered, and that the type of communication also did not have an impact on adherence.

Of the cognitive variables, the pre-communication measure of *attribution of the horse's behaviour problem to external factors* had a weak, significant association with adherence ten days after the communication.

Univariate analyses uncovered moderate, significant associations between adherence ten days after the communication and the immediate change between pre- and post-consultation measures of *value of the outcome of adhering to the advice* and *attribution of the horse's behaviour problem to external factors*. A multiple regression model indicated that the amount of immediate change in value *of the outcome of adhering to the advice* explained slightly more of the variance in adherence than the amount of immediate change in *attribution of the horse's behaviour problem to external factors*, with no evidence of interaction.

The amount of longer term change, between three month follow up and pre-communication measures of *attitude towards horse behaviour consultants* was the only cognitive variable to have a statistically significant association with adherence three months after the communication.

5.1 Cognitive variables as predictors of adherence to the advice of a horse behaviour consultant

5.1.1 Value

The immediate change in *Value of the outcome of adhering to the advice* had the largest relationship with adherence (beta = = 0.338, p = 0.033). The majority of respondents did not report a change in the extent that they valued the outcome of adhering, rather those who reported large increases adhered much more and those who reported large decreases adhered much less in the days immediately following the communication (r = 0.437, p = 0.005, N = 39). Where value of an outcome has been measured as a separate variable for behaviour change in health psychology research it supports the direction and size of the relationship found in the univariate analysis here (Arezes & Miguel, 2008).

Value is an underlying element of all social cognition models (Bandura, 1977), therefore, it is not unreasonable that this variable had the largest relationship

with adherence found here. Considering that adherence aids resolution of animal behaviour problems (Casey & Bradshaw, 2008) it is possible that where clients adhered they achieved desired results and this increased the extent that they valued the outcome of adhering. In turn, this may lead to further adherence. This would suggest that horse behaviour consultants must ensure that their advice is immediately effective so that clients' adherence is reinforced with an event that is valued, and they continue to adhere.

5.1.2 Attribution of the horse's behaviour problem to external factors

Those clients who in their initial cognitive profile did not attribute their horse's behaviour problem to external factors (e.g. the horse's nature, time, facilities) were likely to adhere to the advice in the days immediately following the communication ($r = -0.316$, $p = 0.050$, $N = 39$). This negative relationship is supported by application of attribution theory in health psychology (e.g. Taylor et al, 1984), where it is argued that a person who largely perceives an external cause to a problem may be affected by resignation and perceive it un-rectifiable (e.g. Forsterling, 1988). Horse owners who attribute their horse's behaviour problem largely to external factors may also be resigned to perceiving it un-rectifiable and, so, have less motivation to adhere to the advice proposed to resolve the issue. Conversely, those clients who attributed less to external factors may have perceived that the problem could to be resolved and, in turn, were willing to adhere to the advice.

Horse behaviour consultants have no control over the initial cognitive profile of their clients, essentially what clients come into the process perceiving. But, these findings may help them to identify clients who are inclined to engage in the process and adhere. Where this occurs, the client is likely to resolve their horse's behaviour problem and, therefore, find the service successful (Casey & Bradshaw, 2008). Identifying such clients and fostering them would be of value to the industry as successful cases will promote it.

Where the communication generated a change towards externally attributing the horse's behaviour problem the client was likely to adhere in the days immediately following the communication ($r = 0.418$, $p = 0.009$, $N = 38$; beta $= 0.309$, $p = 0.050$). This is in contrast to the previous finding, where clients who in their initial cognitive profile attributed their horse's behaviour problem less to external factors adhered more.

As previously explained a person who largely perceives an external cause to a problem may be affected by resignation and perceive it as un-rectifiable (Forsterling, 1988). Where a largely internal cause is perceived the affective cognitions are associated with self-doubt (e.g. fear, low self esteem, lack of experience) and where this occurs the individual may perceive that the problem is overwhelming and too large to rectify (Forsterling, 1988). Both extremes are maladaptive as they bring about the cause to be perceived as uncontrollable. When a cause is perceived as uncontrollable a "flight" coping response is adopted, meaning that in order to decrease the negative effects of the problem it is avoided (Amirkhan, 1990). In the context of horse behaviour consultancy, the client may not adhere to the advice and opt to sell the horse instead, or avoid the activity that has elicited the behaviour problem regardless of their wish to undertake it. In contrast, where a cause is perceived as controllable a "fight" coping response is adopted (Amirkhan, 1990) and this may be equated to adherence to the advice of a horse behaviour consultant.

The initial process of referring to a horse behaviour consultant may be undertaken should the owner attribute less to an external cause and perceive that the problem is rectifiable. The reversal in the direction of the relationship may occur once the owner's expectancies about performing the necessary action are added during the communication. If during the consultation the causal attribution shifts away from external factors or remains focused on internal factors it may implicate the owner's behaviour, such as their lack of experience, fear or anxiety. In this instance, negative emotions may develop self-doubt and cause the owner to feel unable to control the cause and, therefore, unable to take the instrumental action. Focusing on an external

attribution may negate the need for the owner to address such internal factors.

It is possible that the owner's lack of experience or fear was the cause of some of the horses' behaviour problems. However, horse behaviour consultants may intuitively know not to highlight such causes. Instead, consultants may be well practiced at providing objective explanations for the problem that do not overtly blame the owner's behaviour.

Building the perception of an external cause may give clients an objective focus that enables them to build confidence in their ability to resolve the problem, eliciting adherence to the advice.

The change in attribution towards perceiving external factors as the course of the horse's behaviour problem had a stronger relationship with adherence than the initial perception of less attribution to external factors. This suggests that in horse owners, although a lesser degree of externality is needed to initiate the behaviour consultancy process, a larger degree of externality is more adaptive for generating a fight response and, therefore, adherence to the advice. The immediate change in *attribution of the horse's behaviour problem to external factors* retained its significant association with adherence ten days after the communication once entered into a regression model (beta = 0.309, p = 0.050), which strengthens the support that this variable is an important predictor of adherence.

Health psychology provides support for both positive (Taylor et al, 1984) and negative (King, 1982) relationships between the degree of external attribution and adaptive behaviour, but does not provide support for the switch in the direction of the relationship found here. It is possible that the switch is specific to the context of horse behaviour consultancy because of the involvement of the horse, which is an unpredictable and causative third party that has the potential to affect the owner. The horse is a factor that is absent from conventional applications of social cognition in health psychology, which may explain why the switch is not reported in such studies.

Health psychology reports that the perceived externality of a cause is a more proximate predictor of behaviour than the degree of internality (Pedroso Goncalves et al, 2008; Taylor et al, 1984; King 1992). This supports the lack of a relationship between *attribution of the horse's behaviour problem to own behaviour* and adherence. Taylor et al (1984) suggest that internalising attribution may have multiple meanings, for example for some it may mean increased control but for others it may mean self-doubt, and this ambiguity may lead to the loss of a clearly defined relationship between internal attribution and adaptive behaviour. There is no evidence outlining whether horse owners generally convey internal attribution to mean increased control or self-doubt, which means that it is possible that there is variation within individuals leading to no defined relationship between *attribution of the horse's behaviour problem to own behaviour* and adherence.

The horse behaviour consultants used in this study informally put forward their experiences of predictors of adherence to their advice. They suggested that those who believe that the problem is entirely due to their horse's temperament are less likely to adhere. They explained this by suggesting that if the problem is perceived to be the horse's nature then the owner believes they have little control over it. They did not refer to the owner's perception of the internality of the problem, instead only referring to the externality. This mirrors the arguments regarding causal attributions (Amirkham, 1990; Forsterling, 1988; Hilt, 2004), and further supports the conclusion that the degree of externality is a more proximate predictor of adherence than the degree of internality.

Whereas this study took a social cognition approach there is a parallel approach to exploring adherence to advice, which focuses on the communication and recommends that it is motivational and persuasive to build the client's confidence to adhere (Lane et al, 2009). Building the perception of an external cause and, therefore, moving the perception away from an internal cause moves the client away from self-doubt and builds confidence. Hence, the finding of this research complements other suggestions on encouraging adherence.

Hart and Hart (1985) report specifically on the context of animal behaviour consultancy and note the importance of avoiding moral judgement and attributing blame to the client. They advocate that remaining objective and focusing on external attributions has more capacity to achieve this.

Furthermore, they highlight the need to complement the client to encourage them to engage and this would be much harder to achieve in a situation where the practitioner is implicating the client for the animal's behaviour problem. Therefore, the finding of this research supports Hart and Hart's (1985) recommendations.

Whereas horse behaviour consultants cannot do anything about the initial cognitive profile of their clients', they can try to modify their clients' cognitive characteristics during a communication. This emphasises the importance of the finding of a moderate relationship between adherence and the amount of change in *attribution of the horse's behaviour problem to external factors,* following the communication. This research suggests that the perceived attribution of the horse's behaviour problem is an important factor in adherence to advice regarding that problem. Furthermore, it suggests that focusing communications on changing the perceived attribution, towards one that is external, encourages adherence to the advice.

5.1.3 Perceived control

Perceived control is a complex variable that differs in interpretation across models and this generates variation within its power to predict behaviour change (e.g. Abraham & Sheeran, 2005; Armitage & Conner, 2001; Harrison et al, 1992; Milne, 2002; Wallston, 1978). However, despite this variation across models the perceived control component has been reported to be the proximate predictor of behaviour within the TPB (Armitage & Conner, 2001) and the HBM (Abraham & Sheeran, 2005). Perceived control has been described as the most proximate predictor of behaviour change (Godin, 1993, Schwazer, 1992). This is in contrast with the findings of this research

where the there was variation in the predictive power of the perceived control variables (*self-efficacy of adhering to the advice* and *extent that external barriers will prevent adherence to the advice*), with none of the relationships showing statistically significant associations.

Furnham and Steele (1993) added to the locus of control model by arguing from their review that there are strong links between causal attributions and control beliefs. They argue that the latter are partly a product of the former. They further conclude that both attributions and control beliefs are important predictors of behaviour and which is the most proximate may differ with context. In the context of horse behaviour consultancy there are many possible influences factoring into adherence to the advice, including uncontrollable external factors, such as facilities and the horse as an unpredictable third party. This makes this context more complex than the situations in which social cognition has been previously applied. A human-horse relationship subjects the owner to risk of injury (Hausberger et al, 2008) and behaviour problems, which may intensify that risk, are likely to evoke fear in the owner which may make it hard for them to control their behaviour. Where fear is inhibiting control of behaviour, or where there are uncontrollable external factors, such a genuine lack of facilities to carry out the advice, the extent that self-efficacy elicits adherence maybe reduced. Thus, it is possible that in this context the proximate predictor of behaviour shifts away from perceived control over own behaviour and towards whether the cause of the problem is controllable.

5.1.4 Attitude towards horse behaviour consultants

A trend in the data suggests clients who came into the consultancy process with a positive attitude towards horse behaviour consultants were more likely to adhere to the advice in the weeks immediately following the communication ($r = 0.292$, $p = 0.068$, $N = 40$). One would expect to find that where clients hold a positive attitude they are willing to engage in the process

and this relationship is supported by health psychology literature (Conner & Sparks, 2005).

Where longer term positive change in *attitude towards horse behaviour consultants* occurred the client was more likely to adhere to the advice three months after the communication ($r = 0.389$, $p = 0.019$, $N = 36$). The direction of this relationship is supported by health psychology research (reviewed in Conner & Sparks, 2005). Hemsworth et al's (1994) paper also supports attitude as a predictor of behaviour change within an animal care setting. However, the different contexts may mean that a causal relationship cannot be assumed. In Hemsworth et al's (1994) setting changing the attitude brought about a change in behaviour. In this setting it may be the resolution of the horse's behaviour problem over time, as result of adherence to the consultant's advice, that caused clients to increase their positive attitude towards horse behaviour consultants. Essentially, the exact nature of this relationship cannot be determined and so in order to achieve long term adherence horse behaviour consultants must simply ensure that their advice is successful in resolving the behaviour problem.

The TRA and TPB propose that where a person holds a positive attitude towards a behaviour they are more likely to have intention towards performing it and take action (Ajzen, 1988). As the client could have little knowledge of the behaviours that they would be asked to undertake to resolve their horse's behaviour problem, their attitude towards these behaviours could not be measured. Instead *attitude towards horse behaviour consultants* was based upon salient beliefs about horse behaviour consultants. This means that *attitude towards horse behaviour consultants* is not directly comparable with the attitude variable found in other studies. Despite this, similar correlations in health psychology have uncovered similar effect sizes (reviewed in Conner & Sparks, 2005), therefore, offering support for this relationship, although one must remain aware of the differences in the variables used.

5.1.5 Perceived susceptibility, perceived severity and perceived benefit

A trend in the data suggested that those clients who changed through the consultancy process towards perceiving that their horse was susceptible to behaviour problems, or to the existing one worsening, were likely to adhere to advice in the longer term ($r = 0.297$, $p = 0.083$ $N = 35$). This relationship indicates that where clients gained a better understanding of the problem they perceived how it could worsen if they did not act and so adhered. This is speculative and the actual cause and effect cannot be determined, however, increased perception of the horse's susceptibility to behaviour problems should be noted as a potential predictor of longer term adherence.

No trends emerged between *perceived severity of the horse's behaviour problem* and adherence. This is supported by Casey and Bradshaw (2008), who also found no direct association between how severe owners rated their cat's behaviour problem and adherence to the treatment. However, they did find that categorically those behaviour problems that impacted on the owners' life did elicit more adherence than those that did not. This suggests that the extremity of the impact of the behaviour problem does affect adherence. This study did not record the horses' behaviour problems because it took the approach that adherence would be affected not by the horse's behaviour per say, but how much of a problem it was to the owner and, therefore, how much the owner wanted to resolve it. The extent that the owner wants to resolve the problem may be a factor of *value of the outcome of adhering to the advice*. It is possible that in the context of animal behaviour consultancy the owner may perceive the problem as severe but not find it to impact on them and, therefore, not value resolving it. *Value of the outcome of adhering to the advice* was found to have an association with adherence (see above), which suggests that valuing the resolution of an animal's behaviour problem is a more proximate predictor of adherence than how severe it is perceived to be.

A trend in the data suggests that where a client comes into the process perceiving that they will benefit from the advice they are likely to adhere to

advice in the longer term (r = 0.289, p = 0.088, N = 36). Perceived benefit is the only cognitive variable whose pre-communication measure had a creditable association with adherence at three months. This suggests that whereas initial adherence is predicted by the client coming into the process attributing the horse's behaviour problem less to external factors, and to some extent holding a positive attitude towards horse behaviour consultants, longer term adherence may only be predicted by a high degree of perceiving that one will benefit from the advice; essentially perceiving that the process will be of use. Establishing whether a client is committed to believing that the process will be beneficial may help horse behaviour consultants identify those clients who will continue to adhere and engage in the process in the long term.

Health psychology literature provides support for the relationship between pre-communication measures of *perceived benefit of adhering to the advice* and longer term change in *perceived susceptibility of the horse developing a behaviour problem* and adherence found here (Abraham & Sheeran, 2005; Milne, 2002; Harrison et al, 1992). The size of trends found in this research did exceed those reported in health psychology reviews (Abraham & Sheeran, 2005; Milne, 2002; Harrison et al, 1992). The novelty of the horse behaviour consultancy context means that there is no evidence from previous research to contest the greater importance of *perceived susceptibility of the horse developing behaviour problem* and *perceived benefit of adhering to the advice* in this context.

5.1.6 Subjective norms

There were varied relationships between *subjective norms* and adherence to the advice of a horse behaviour consultant, with no credible trends emerging. This suggests that this variable does not predict adherence in this context. It is possible that this is a population effect, where taking the decision to enter into the process means that the clients have already overcome any social conflict that they perceive they may encounter. Alternatively, it may be possible that the horse behaviour consultants used in this study were

perceived as credible and did not elicit a negative social norm to be associated with them, resulting in the variable being less important. Wider variation in the credibility of the consultant may increase the importance of social norms.

The lack of an association between *subjective norms* and adherence to the advice of a horse behaviour consultant is not inconsistent with health psychology literature. Meta-analyses of the components of the TPB suggest that *subjective norms* are not as strong predictors of behaviour as the other variables in the model (Armitage & Conner, 2001; Conner & Sparks, 2005). Few studies have correlated *subjective norms* directly with behaviour, concentrating more on correlations with behavioural intention (Armitage & Conner, 2001). However, where *subjective norms* have been correlated directly with behaviour there is variation in the extent that the variable has been found to be a significant predictor (e.g. Quick et al, 2008), or not to be a significant predictor (e.g. Gatt and Sammut, 2008) of behaviour.

5.2 The type of communication and owner demographics as predictors of adherence to the advice of a horse behaviour consultant

A lack of a statistically significant difference between the amount of adherence generated by the three types of communication (individual consultation, group workshop or larger scale demonstration) suggests that the type of communication did not have an impact on adherence. It is not likely that the format of the communication is not relevant to the individual horse's behaviour problem. Rather, this suggests that the type of consultation selected by the clients was appropriate for the scale and nature of their particular problems. This provides support for the social cognition approach where the actual events taking place within the communication are not controlled. Instead, the communication is taken as a black box that along with other objective variables, thoughts and beliefs factor into cognitive variables that do have a direct affect on behaviour (Conner & Norman, 2005b).

There was also a lack of statistically significant difference in adherence between each of the groups within the demographic variables (owner gender, age, type and level of skill). This suggests that these variables in isolation do not impact on adherence to the advice of a horse behaviour consultant. As cognitive variables were found to have associations with adherence this study offers support for cognitive variables as having a direct effect on behaviour, where demographics did not.

5.3 Conclusions in relation to health psychology

In the most part the findings of this study are consistent with those found in health psychology where the theory of social cognition is most often applied. The association between *value of the outcome of adhering to the advice* and adherence was similar to that found in health psychology (Arezes & Miguel, 2008). Considering value has prominent part in social cognition (Bandura, 1977) its place as the most proximate predictor of adherence to the advice of a horse behaviour consultant is not unreasonable. The degree of external attribution as a predictor of behaviour and the lack of association between the degree of internal attribution and adherence are also consistent with health psychology theory (Pedroso Goncalves et al, 2008; Taylor et al, 1984; King 1992). The weak associations found between *perceived severity of the horse's behaviour problem*, *perceived susceptibility of the horse developing a behaviour problem* and *perceived benefit of adhering* and adherence are consistent with suggestions that the HBM and its components are not the most proximate predictors of behaviour (Schwarzer, 1992). Finally, the variables adapted from the components of the TRA also produced similar associations with adherence as those found in health psychology, despite the differences between the attitude variable of the TRA and *attitude towards horse behaviour consultants*.

The one discrepancy between the findings of this research and those of health psychologists is that perceived control is argued to be the most proximate predictor of behaviour (Armitage & Conner, 2001; Conner &

Sparks, 2005; Godin, 1993; Schwarzer, 1992) and this was not replicated in this study. It is possible that in the context of horse behaviour consultancy fear may make it hard for clients to control their behaviour or genuine external factors, such as a lack of facilities, may control the client's ability to carry out the advice. In such circumstance perceived control over the instrumental action maybe less important. However, perceived control over the action and perceived control over the cause are thought to be interrelated (Furnham & Steele, 1993). This research found causal attribution to be an important predictor of adherence and, therefore, it is possible that perceived control is still an important predictor of adherence in this context, but manifested as perceived controllability of the cause, rather than over the action.

The variables found to have a significant relationship with adherence to the advice of a horse behaviour consultant did not fit into one of the social cognition path models. The most proximate predictors of adherence were *value of the outcome of adhering to the advice* and *attribution of the horse's behaviour to external factors*. Both of these variables are prominent elements of attribution theory (e.g. Forsterling, 1988), which suggests that attribution theory is the social cognition model that is most applicable to the context of horse behaviour consultancy. Whereas the path models are predominantly applied to medical scenarios, for example healthy eating (e.g. Booth-Butterfield & Reger, 2004), smoking cessation (e.g. Kraft et al, 1999) and heavy alcohol intake (e.g. Neal & Carey, 2004), attribution theory has been applied to relationship counselling and controlling emotional stress (Forsterling, 1988; Graham & Folks, 1990), which may be akin to horse behaviour consultancy. The relationship between the horse as a companion animal and its owner is generally found to be one of importance in the owner's life (Birke & Brandt, 2009). When one also considers the amount of time, commitment and cost that is invested into the relationship it is in keeping that disruption to it causes emotional stress in the owner. Therefore, as suggested by the findings here attribution theory may have most relevance to horse behaviour contexts.

5.4 Conclusions for horse behaviour consultancy

Horse behaviour consultants advise owners on horse behaviour and where suitably educated they do this through the application of horse ethology and in particular learning theory. Application of this knowledge and understanding goes some way towards minimising prominent welfare issues affecting the domestic horse (see Chapter One). Enabling horse behaviour consultants to provide an effective service gives the industry the capacity to expand and provide a vehicle for promoting these methods within the horse owning community, which will in turn help to address horse welfare on a wider scale.

The findings of this study suggest that horse behaviour consultants may be reasonably confident that those clients who come into the process attributing their horse's behaviour problem less to external factors and have a positive attitude towards horse behaviour consultants, will adhere to their advice in the days immediately following the communication. In addition, those clients who come into the process perceiving that they will benefit from it may be more likely to adhere in the longer term. Qualitative comments made by horse behaviour consultants support that the extent that clients attribute their horse's behaviour problem to external factors affects adherence. Clients' initial cognitive profiles cannot be influenced, but exploring whether they hold these characteristics may give horse behaviour consultants an indication as to whether they will engage in the process and, therefore, go on to find it successful. An ability to recognise such clients gives control over where to invest time and resources so that the service is constructive; and where the service is constructive it is likely to be promoted.

Horse behaviour consultants do have the opportunity to change a client's perceptions during the consultation and, therefore, the findings of real interest are those that demonstrate associations between the amount of change in cognitive variables following the communication and adherence. The findings identified positive correlations between the amount of immediate

change in *value of the outcome of adhering to the advice* and *attribution of the horse's behaviour problem to external factors* as having associations with adherence ten days after the communication. These suggest that where horse behaviour consultants can influence these cognitive variables towards increasing value of the outcome of adhering and shifting attribution towards external factors they may foster adherence to their advice.

The amount of immediate change in *value of the outcome of adhering to the advice* explained marginally more variation in adherence than the amount of immediate change in *attribution of the horse's behaviour to external factors*. The relative importance of this variable as a predictor suggests that principally horse behaviour consultants must ensure that adherence to their advice is valued and, secondly, developing the client's attribution of an external, controllable, cause of their horse's behaviour problem also aids adherence.

An increase in positive attitude towards horse behaviour consultants predicted longer term adherence. It is likely that where desired changes in the horse's behaviour are achieved attitude towards horse behaviour consultants will become more positive. This suggests that it is not a change in attitude that brings about adherence, but rather adhering brings about desired results and this improves attitude towards the consultant.

The final research aim was to develop recommendations for horse behaviour consultants on how to encourage adherence to their advice. Based on the findings of this research, one would recommend that horse behaviour consultants are receptive to those clients who come into the process attributing their horse's behaviour problem less to external factors and believe that they will benefit from adhering to the advice, as these clients are likely to engage in the process and adhere initially and longer term.

Secondly, and most importantly, horse behaviour consultants must demonstrate the effects of their advice early so that the client's adherence is reinforced with an event that is valued and they continue to adhere. It may

not always be possible to demonstrate an immediate improvement in the horse's behaviour problem, and in such circumstances giving examples of case studies where the same or similar behaviour problem has been resolved may be an appropriate alternative. A further alternative may be to demonstrate immediate effects of appropriate application of learning theory; and the consultant may wish to have a pre-prepared tool that demonstrates that the theory is effective (e.g. teaching the horse to move away from pressure by effective use of negative reinforcement). The key meaning of this recommendation is to validate the soundness of the advice.

Thirdly, horse behaviour consultants should develop their client's perception of an external cause of their horse's behaviour problem. This may negate the need for the owner to address an internal cause that may be associated with negative emotions such as fear and lack of confidence in their own ability, which are hard to control. Building the perception of an external cause may give clients an objective focus that enables them to build confidence in their ability to resolve the problem and elicits their adherence to the advice.

Qualitative data from practitioners suggests that building confidence is already recognised as important. The association found here suggests that in order to develop confidence, horse behaviour consultants must explore their client's perceived attribution of their horse's behaviour problem to gain an understanding of how controllable they perceive the cause to be. The communication must then be tailored to foster the most adaptive attributional style, which in practice means suggesting a cause that does not overtly blame the client's own behaviour and works towards building the client's confidence in their ability to address the cause.

The findings support comments previously made by horse behaviour consultants and for this reason some may not consider this research revelatory. However, it provides important evidence to support practitioners' intuition, adding nomenclature and clarification to key concepts, and it

provides consultants in training with an indication of what factors are key to providing a successful service.

Where these recommendations can be implemented there is the potential to provide a service that has been demonstrated to be effective. This may bring structure and confidence to the service and may help to raise its profile. The resultant promotion of a thorough understanding of horse ethology and the correct application of learning theory may advance progress in minimising associated horse welfare concerns.

5.5 Limitations and future research

The social cognition approach has merits for preliminary, observational studies such as this, as it has a well established theoretical background with clear guidance on which variables have associations with behaviour change, thus providing a sound starting point. The view of cognitive variables as the end result of deliberative processing of objective stimuli allows a design that does not seek to measure such objective stimuli, but rather measures the cognitive variables as the outcome (Conner & Norman, 1995b). This was of use to this study as it allowed for a methodology that did not interfere with the horse behaviour consultants' time or methods and could be applied to any consultancy process, which was necessary to increase access to the target population and achieve an adequate sample size.

The approach was successful in this way as, despite variation in N between the individual analyses due to the variance in return across the three questionnaires, in the most part N was sufficient for the univariate analyses and the results reflected Cohen's (1998) suggestions on sample size, as all but one of the correlation coefficient values $\geq$ 0.3 were found to be statistically significant.

The study asked for a large commitment from participants and addressed a topic about which there may have been some personal guilt or

embarrassment and this may have contributed to the modest number who entered into the process. The questionnaires that were returned demonstrate that having made the initial commitment the majority of participants returned responses for all three elements. A larger sample size may have supported more complex statistical analyses, however, the sample was fit for purpose in establishing potential predictors of adherence to the advice of a horse behaviour consultant.

Despite the advantages of using cognitive variables to understand behaviour, the approach can lead researchers to ignore other non-cognitive variables that also have an impact on behaviour, often resulting in small amounts of variance explained by a cognitive variables model (Conner & Norman, 1995b). The model established here explained 23.6% of the variance in immediate adherence, which suggests that there are confounding variables not accounted for that had an impact on the clients' adherence behaviour.

The legitimacy of the advice was controlled to an extent by selecting only horse behaviour consultants who advise from sound scientific principles. However, this may have still presented a confounding variable, for example where clients were aware that advice was not valid they have may have chosen not to adhere to it.

Similarly, although this study found no difference in adherence between the individual and group modes of communication, it is probable that different types of people attend individual consultations and larger scale workshops. One could speculate that those clients attending individual consultations and so investing more money into the process may have a horse with a more severe problem, and that those who attend workshops have perhaps more general interest. The relationship built up during the process of an individual consultation may also have a coercing effect on the client to adhere. Additionally, the close relationship may mean that advice may be more specific, can be better tailored and better explained to the individual, again affecting adherence.

Further research aiming to have more control over the type of behaviour problem and the type of advice given will offer opportunities to determine if adherence is also influenced by these factors and their inter-relationship with the cognitive variables identified as worth further investigation in this study.

Splitting respondents into groups defined by the type of behaviour problem displayed by the horse may provide a capacity to control these variables by accounting for the differences in advice generated by different behaviour problems.

Additionally, Conner & Norman (1995b) cite lack of specificity in measures as contributing to small variances explained. Measures of adherence that are tailored to a specific behaviour problem may yield stronger associations between adherence and the predictor variables.

Unless a social cognition model is used to test the effect of a specific intervention, control groups are not generally used (Conner & Norman, 1995b) and, therefore, a control group was not generated in this observational study. However, there is the possibility that change in the cognitive variables found here was induced by the filling in of the questionnaires and talking to a sympathetic third party rather than by partaking in a consultation. In future research, the inclusion of a control group who complete the questionnaires and meet with a consultant to describe their horse's behaviour problems, but receive no advice, would allow one to test the effect of the research manipulation and improve the robustness of the findings.

The observational approach to this study was fit for purpose in identifying predictors of adherence to the advice of a horse behaviour consultant, but a rigorous experimental design, where variables such as those describe above are controlled, may better investigate the variance in adherence.

This preliminary study suggests that attribution theory is the social cognition model that is most applicable to the context of horse behaviour consultancy. The full attribution theory model is multi-dimensional (Chapter Two) and

where a specific tool that measures the entire model is applied it may increase the variance in adherence accounted for. One would propose that the next step is to test the amount of variance in adherence to the advice of a horse behaviour consultant that is accounted for by the full attribution theory model, and applies the controls discussed above so that more definitive and directed advice can be generated than is possible from this first study.

APPENDICES

APPENDIX 1

Data used in the establishment of internal consistency (construct validity) and the items for the variable *attitude towards horse behaviour consultants*

Appendix 1.1 Descriptive statistics of the items of the cognitive variables *attitude towards horse behaviour consultants*, *extent that external barriers will prevent adherence to the advice*, *perceived severity of the horse's behaviour problem* and *attribution of the horse's behaviour problem to external factors.*

Cognitive Variables	*Item*	*mean*	*+/-SD*	*Kolmogorov -Smirnov*	*p*
Attitude towards horse behaviour consultants	1	4.33	1.63	.152	.200
	2	2.80	1.32	.173	.200
	3	6.00	1.73	.318	.000
	4	4.66	1.71	.181	.199
	5	6.00	1.92	.365	.000
	6	1.93	0.70	.271	.004
	7	1.93	0.96	.234	.026
	8	4.66	1.29	.169	.200
	9	4.60	1.18	.294	.001
	10	4.33	1.84	.232	.028
	11	2.27	1.22	.253	.011
	12	3.13	1.40	.198	.119
	13	2.40	1.29	.224	.041

	14	4.13	1.59	.240	.020
	15	3.66	1.45	.211	.072
	16	5.33	1.04	.205	.091
	17	5.60	.91	.207	.004
	18	6.53	.74	.402	.000
	19	5.60	1.72	.258	.008
	20	4.26	1.48	.229	.034
	Total	84.27	6.75	.159	.200
Extent that external barriers will prevent adherence to the advice	1	2.53	1.41	.176	.200
	2	3.07	1.75	.217	.200
	3	3.40	2.06	.184	.185
	4	2.53	1.73	.202	.102
	5	2.27	1.53	.262	.007
	Total	13.80	6.64	.162	.200
Perceived severity of the horse's behaviour problem	1	5.07	2.08	.223	.043
	2	4.93	2.12	.235	.025
	3	5.27	2.15	.300	.001
	Total	15.27	5.52	.157	.200

Attribution of the horse's behaviour problem to external factors	1	2.53	2.44	.335	.000
	2	3.40	2.44	.250	.012
	3	2.55	1.99	.272	.004
	4	3.13	2.42	.280	.002
	5	4.66	2.19	.181	.200
	Total	20.80	8.65	.156	.200

Appendix 1.2 Original 20 items that were developed from the completed construct space for the cognitive variables attitude towards horse behaviour consultants and their r values when correlated against the total score of all items for the variable**.**

Item	*r*	*p*
1. There are too many approaches to defining an equine behaviour advisor	.445	.051
2. Equine behaviour advisors are only effective if they are academically qualified in an appropriate subject	.159	.286
3. Methods used by some equine behaviour advisors, such as reward and positive reinforcement, should be used in all training of horses	.538^{+}	.019
4. Lack of standardisation of equine behaviour advisors' methods means that there is no guarantee of success	.181	.259
5. Equine behaviour advisors are only effective if the counsellor works with both the horse and the owner	.525^{+}	.022
6. Equine behaviour advisors are only useful for horses with behaviour problems	-.021^{+}	.471
7. An equine behaviour advisor should only be used as a last resort when all other methods have failed	-.156^{+}	.285

8. Other trainers often misunderstand equine behaviour advisors	-.030	.458
9. Most equine behaviour advisors do not have enough experience to solve all problems	-.004[+]	.495
10. Good traditional trainers are just as effective as equine behaviour advisors	.223[+]	.212
11. Using an equine behaviour advisor is a waste of time and money	-.064[+]	.410
12. Equine behaviour advisors are always effective at solving equine behaviour problems	.568	.014
13. All equine behaviour advisors are good at their job	.456[+]	.044
14. I am very suspicious of anyone who refers to them selves an 'equine behaviour advisor' or any similar term	-.246[+]	.188
15. I believe that equine behaviour advisors know best for solving equine behaviour problems	-.429	.055
16. Some equine behaviour advisors base their work upon scientific principle	.250	.185
17. Equine behaviour advisors base their work upon an understanding of horse psychology	.367[+]	.089
18. Equine behaviour advisors should teach owners how to understand their horses	.345[+]	.104
19. Methods used by some equine behaviour advisors, such as positive reinforcement, are a kinder approach to training	.466[+]	.040
20. Equine behaviour advisors work by forming strong bonds with the horse	.660[+]	.004

[+] indicates Spearman's rank order correlation calculation, instead of Pearson's product moment correlations

Appendix 1.3 Items of the cognitive variable *attitude towards horse behaviour consultants* correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 15).

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17	Item 18	Item 19	Item 20
Item 1		0.49	.001	-.014	0.389	.261	.062	-.066	-.055	.445	.212	.052	.206	-.024	.666**	-.019	-.215	-.011	-.182	.084
Item 2	0.49		-.300	-.698**	.317	.303	-.174	.175	-.063	-.429	-.205	.371	.641**	-.295	.352	-.025	-.015	-.321	-.201	.328
Item 3	.001	-.300		.306	.079	-.190	-.317	-.548*	-.034	.093	-.196	.361	.252	-.020	-.255	-.031	-.095	.555*	772**	146
Item 4	-.014	.698**	.306		-.207	.003	.149	-.307	-.389	.598*	.096	.188	-.645**	.133	-.307	.218	.119	.169	.309	-.118
Item 5	.389	.317	.079	-.207		-.032	-.091	.461	.070	-.139	.081	.150	.278	.097	-.398	.356	.125	.079	-.121	.117
Item 6	.261	.303	-.190	.003	-.032		.155	-.002	-.218	-.055	.168	-.160	.165	.087	-.126	-.560*	.612*	-.322	.311	.110
Item 7	.062	-.174	-.317	.149	-.091	.155		-.141	.376	.424	.096	-.617*	-.377	.361	-.373	-.297	-.143	-.333	-.278	.060
Item 8	-.066	.175	-.548*	-.307	.461	-.002	-.141		-.027	-.419	.038	-.084	.008	.286	.179	.338	.140	-.170	-.547*	-.312
Item 9	-.055	-.063	-.034	-.389	.070	-.218	.376	-.027		-.164	.358	-.297	.031	.158	-.131	-.490	.069	.134	-.105	.281
Item 10	.445	-.429	.093	.598*	-.139	-.055	.424	-.419	-.164		.196	-.120	-.422	.103	-.607*	.209	.040	.139	.087	-.002

Item 11	.212	-.205	-.196	.096	.081	.168	.096	.038	.358	.196		-.239	-.457	.192	-.479	-.270	-.115	-.080	-.480	-.065
Item 12	.052	.371	.361	-.188	.150	-.160	-.617*	-.084	-.297	-.120	-.239		.636*	-.045	.148	.280	.190	.082	.452	.338
Item 13	.206	.641**	.252	-.645**	.278	.165	-.377	.008	.031	-.422	-.457	.636*		-.347	.243	-.156	-.153	.124	.311	.479
Item 14	-.024	-.295	-.020	.133	.097	.087	.361	.286	.158	.103	.192	-.405	-.347		-.454	.116	-.165	-.237	-.447	-.483
Item 15	.666**	.352	-.255	-.307	-.398	-.126	-.373	.179	-.131	-.607*	-.479	.148	.243	-.454		.065	.177	.030	.144	.034
Item 16	-.019	-.025	-.031	.218	.356	-.560*	-.297	.338	-.490	.209	-.270	.280	-.156	.116	.065		.560*	.114	.083	-.243
Item 17	-.215	-.015	-.095	.119	.125	.612*	-.143	.140	.069	.404	-.115	.190	-.153	-.165	.177	.560*		.170	.187	.321
Item 18	-.011	-.321	.555*	.169	.079	-.322	-.333	-.170	.134	.193	-.080	.082	.124	-.237	.030	.114	.170		.641*	.260
Item 19	-.182	-.201	772**	.309	-.121	.311	-.278	-.547*	-.105	.087	-.480	.452	.311	-.447	.144	.083	.187	.641*		.420
Item 20	.084	.328	146	-.118	.117	.110	.060	-.312	.281	-.002	-.065	.338	.479	-.483	.034	-.243	.321	.260		.084

APPENDIX 2

Survey pack that was distributed to participants

Appendix 2.1 Original informative letter

Dear participant,

You are cordially invited to take part in a research study titled:

Exploring The Equine Behaviour Industry

What is the purpose of the research and why is it important?
Equine behaviour is a fast growing industry, but so far there has been little consideration of how effective behaviourists are for horse owners. In this study I am aiming to;

- Establish whether horse owners seeking advice from an equine behaviourist benefit more from individual consultations, group demonstrations or workshops.
- We are also interested in which of the owners' characteristics determine how they benefit from the advice given to them.

By looking at these things we will be able to provide advice so when you or your friends use an equine behaviourist you are getting the best service possible!

If you own an equine, or are the carer of a particular equine, I would be much appreciative if I could have a small piece of your time.

What does taking part entail?
Taking part entails;

- Completing a short questionnaire before your consultation, workshop, or demonstration. The questionnaire should take no longer than 20minutes to complete.
- Complete a very similar questionnaire ten days after the consultation, workshop, or demonstration.
- You can also opt to be contacted by telephone to give any anecdotes that you feel would be beneficial to the project. This is entirely optional.

If you decide to take part you are still free to withdraw at any time, and all the information you give will be confidential.

The Results and contacts for further information
The results of the study will be presented to the equine behaviourist taking part and will be used in an MPhil thesis. If you would like a copy of the results you can obtain them from the named researchers after autumn 2008. The results may also be published in academic journals similarly if you wish to have a copy you can ask us to send them when they are available.

If you have any questions, or wish for further information at anytime, you can contact the lead researchers Ruth Jobling and Dr Emma Creighton at the Department of Biology, University of Chester, Parkgate Road, Chester, CH1 4BJ. You may also contact Ruth or Emma by email on r.jobling@chester.ac.uk and e.creighton@chester.ac.uk

Thank you for taking the time to read this and we look forward to your help with this research.

Appendix 2.2 Consent form

Consent form

Title of project: Advice on Equine Behaviour

Name of Researchers: Ruth Jobling and Dr Emma Creighton

Please initial box

1. I confirm that I have read and understood the information sheet provided for the above study. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving reason. ☐

3. I am willing to contacted by telephone / email to discuss my completed questionnaires.
   Contact number / email address:……. ☐

4. I agree to take part in the above study. ☐

5. I agree to complete a third questionnaire of similar content as part of a three month follow up. ☐

Name of participant	Date	Signature

Name of Researcher	Date	Signature

Appendix 2.3 Pre-communication questionnaire

University of Chester

Advice on Equine Behaviour

I am…

A. Participating in a one-to-one consultation

B. Participating in a workshop

C. Attending a demonstration

Please complete this questionnaire BEFORE you watch the demonstration, or take part in the workshop or consultation. Please return it straight away in one of the stamped addressed envelopes provided.

The second questionnaire is for you to complete 10 DAYS AFTER this event. Please return this in the second envelope. It is important that you do not compare your responses in the two questionnaires, but simply give your honest opinion at the time you complete each.

- Throughout this questionnaire the term **equine behaviour advisor** is used to refer to people who give advice on equine behaviour as a profession.
- The term **programme of advice** refers to the advice given to you by your equine behaviour advisor.

Section 1: Your thoughts on equine behaviour advisors

We are interested in your own personal views of people who give advice on equine behaviour as a profession. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number.

Example

Equine behaviour advisors are no more effective than good conventional trainers.

1	*2*	*3*	*4*	*5*	*6*	*7*
Strongly disagree						*Strongly agree*

Beginning of questions

1. **Equine behaviour advisors are only effective if academically qualified in an appropriate subject.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. **Methods used by some equine behaviour advisors, such as reward and positive reinforcement, should be used in all training of horses.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. **Equine behaviour advisors are only effective if the advisor works with both the horse and owner.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. Equine behaviour advisors are always effective at solving equine behaviour problems.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. All equine behaviour advisors are good at their job.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. I believe that equine behaviour advisors know best for solving equine behaviour problems.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. Equine behaviour advisors base their work upon an understanding of horse psychology.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. Equine behaviour advisors should teach owners how to understand their horses.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. Methods used by some equine behaviour advisors, such as positive reinforcement, are a kinder approach to training.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. Equine behaviour advisors work by forming strong bonds with the horse.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 2: What may help you, or prevent you, from following your equine behaviour advisor's advice.

We are interested in what you feel may limit or improve your own ability to follow an equine behaviour advisor's advice. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in section 1.

Beginning of questions

1. **I believe I may struggle to access the training facilities I need to complete the programme of advice.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. **I believe I may struggle to find the time I need to complete the programme of advice.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. **believe I may struggle to find the money I need to complete the programme of advice.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. **I worry that my horse won't respond to the programme of advice.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. The actions of other people will prevent me from completing the

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. I am directly responsible for completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. I feel unsure that I can complete the programme of advice without continuous support.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. I feel there is social pressure not to use an equine behaviourist.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. I will follow the programme of advice even if others around me disapprove.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 3: Your horse

During this section the term ***Behavioural Problem*** **refers to anything your horse does that causes you a problem. This can be any behaviour when ridden or in the stable or field, and however large or small**. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers. If you feel your horse does not have any behavioural problems and you are struggling to answer questions 1-9, please jump to questions 10-13.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in sections 1 and 2.

Beginning of questions

1. **My horse's behavioural problems are detrimental to its own well being.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. **My horse's behavioural problems are detrimental to my well being and/or the well being of people around me.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. **My horse's behavioural problems interfere with the activities (work) I'd like to do with my horse.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. **The training facilities I have available have contributed to the development of my horse's behavioural problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. **Lack of time available to spend with my horse has contributed to the development of my horse's behavioural problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. **Lack of money available has contributed to the development of my horse's behavioural problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. **My horse was always destined to develop behavioural problems because that is the way he/she is.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. **The actions of other people have contributed to the development of my horse's behavioural problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. **My own behaviour has contributed to the development of my horse's behavioural problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. **My horse and I will benefit greatly from completing the programme of advice.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. By completing the programme of advice I am likely to minimise my horse's behavioural problems / minimise the possibility of my horse developing behavioural problems.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. Achieving an improvement in my horse's behaviour is of great value to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. Please answer EITHER a) OR b).

a. I feel that my horse is unlikely to develop a behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

b. I feel that my horse and I are susceptible to developing behavioural problems that are worse than we already have.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Thank You!

Information about You and Your Horse

(It is important that this section of the form is completed as it will help us to pair up your 2 questionnaires)

About Your Horse:

Name: ……...

Breed / Type: ……

Age in years: …….

Sex: Mare Gelding Stallion

Please describe briefly the nature of any behavioural problems you feel your horse displays. *(The term behavioural problem refers to any behaviour displayed by your horse that causes you a problem, when ridden or in the stable or field, however large or small).* Include details of whether you have addressed the problem and if so how.

About You:

Sex: M / F Age: under 20 / 21-30 / 31-40 / 41-50 / 51-60 / 61 or older

For how many years have you ridden / driven?

For how many years have you kept horses or ponies?

Would you describe yourself as a leisure rider / committed amateur / professional?

Do you consider your horse skills to be novice / intermediate / advanced?

Appendix 2.4 Post-communication questionnaire

Advice on Equine Behaviour

Please complete this questionnaire 10 days after you have watched a demonstration, or participated in a workshop or consultation. Please return in the stamped addressed envelope provided.

- Throughout this questionnaire the term **equine behaviour advisor** is used to refer to people who give advice on equine behaviour as a profession.
- The term **programme of advice** refers to the advice given to you by your equine behaviour advisor

Section 1: Your thoughts on equine behaviour advisors

We are interested in your own personal views of people who give advice on equine behaviour as a profession. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number.

Example

Equine behaviour advisors are no more effective than good conventional trainers.

1	*2*	*3*	*4*	*5*	*6*	*7*
Strongly disagree						*Strongly agree*

Beginning of questions

1. **Equine behaviour advisors are only effective if they work with both the horse and the owner.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. **Methods used by some equine behaviour advisors, such as positive reinforcement, are a kinder approach to training.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. **Equine behaviour advisors are always effective at solving equine behaviour problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. **Equine behaviour advisors are only effective if academically qualified in an appropriate subject.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. **Methods used by some equine behaviour advisors, such as reward and positive reinforcement, should be used in all training of horses.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. **All equine behaviour advisors are good at their job.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. **Equine behaviour advisors work by forming strong bonds with the horse.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. **I believe that equine behaviour advisors know best for solving equine behaviour problems.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. **Equine behaviour advisors should teach owners how to understand their horses.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. Equine behaviour advisors base their work upon an understanding of horse psychology.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 2: What may help you, or prevent you, from following the equine behaviour advisor's advice.

We are interested in what you feel may limit, or improve, your own ability to follow an equine behaviour advisor's advice. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in section 1.

Beginning of questions

1. At present I often think about carrying out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. At present I am preparing to carry out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. At present I am in the process of carrying out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. I have successfully been carrying out the advice given to me for some time.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. I am directly responsible for completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. I feel unsure that I can complete the programme of advice without continuous support.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. I feel there is social pressure not to use an equine behaviourist.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. I will follow the programme of advice even if others around me disapprove.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. I believe I may struggle to access the training facilities I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. I believe I may struggle to find the time I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. I believe I may struggle to find the money I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. I worry that my horse won't respond to the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. The actions of other people will prevent me from completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 3: Your horse

During this section the term ***Behavioural Problem*** **refers to anything your horse does that causes you a problem. This can be any behaviour ridden or in the stable / field, and however large or small**. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers. If you feel your horse does not have any behavioural problems and you are struggling to answer questions 1-9, please jump to questions 10-13.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in section 1and 2.

Beginning of questions

1. **My horse's behavioural problem interferes with the activities (work) I'd like to do with my horse.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. **My horse's behavioural problem is detrimental to its own well being.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. **My horse's behavioural problem is detrimental to my well being and/or the well being of people around me.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. **The training facilities I have available have contributed to the development of my horse's behavioural problem.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. **Lack of time available to spend with my horse has contributed to the development of my horse's behavioural problem.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. **Lack of money available has contributed to the development of my horse's behavioural problem.**

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. My horse was always destined to develop a behavioural problem because that is the way he/she is.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. The actions of other people have contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. My horse and I will benefit greatly from completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. By completing the programme of advice I am likely to minimise my horse's behavioural problem / minimise the possibility of my horse developing a behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. My own behaviour has contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. Achieving an improvement in my horse's behaviour is of great value to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. Please answer EITHER a) OR b).

c. I feel that my horse is unlikely to develop a behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

d. I feel that my horse and I are susceptible to developing behavioural problems that are worse than we already have.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Thank You!

Information about You and Your Horse

(It is important that this section of the form is completed as it will help us to pair up your 2 questionnaires)

About Your Horse:

Name: ……...

Breed / Type: ……

Age in years: …….

Sex: Mare Gelding Stallion

Please describe briefly the nature of any behavioural problems you feel your horse displays. *(The term behavioural problem refers to any behaviour displayed by your horse that causes you a problem, when ridden or in the stable or field, however large or small).* Include details of whether you have addressed the problem and if so how.

About You:

Sex: M / F Age: under 20 / 21-30 / 31-40 / 41-50 / 51-60 / 61 or older

For how many years have you ridden / driven?

For how many years have you kept horses or ponies?

Would you describe yourself as a leisure rider / committed amateur / professional?

Do you consider your horse skills to be novice / intermediate / advanced?

Appendix 2.5 Follow up questionnaire

University of Chester

Advice on Equine Behaviour

Please complete this questionnaire three months after you have watched a demonstration, or participated in a workshop or consultation. Please return in the stamped addressed envelope provided.

- Throughout this questionnaire the term **equine behaviour advisor** is used to refer to people who give advice on equine behaviour as a profession.
- The term **programme of advice** refers to the advice given to you by your equine behaviour advisor.

Section 1: Your thoughts on equine behaviour advisors

We are interested in your own personal views of people who give advice on equine behaviour as a profession. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number.

Example

Equine behaviour advisors are no more effective than good conventional trainers.

1	*2*	*3*	*4*	*5*	*6*	*7*
Strongly disagree						*Strongly agree*

Beginning of questions

1. Equine behaviour advisors are only effective if they work with both the horse and the owner.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. Methods used by some equine behaviour advisors, such as positive reinforcement, are a kinder approach to training.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. Equine behaviour advisors are always effective at solving equine behaviour problems.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. Equine behaviour advisors are only effective if academically qualified in an appropriate subject.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. Methods used by some equine behaviour advisors, such as reward and positive reinforcement, should be used in all training of horses.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. All equine behaviour advisors are good at their job.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. Equine behaviour advisors work by forming strong bonds with the horse.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. I believe that equine behaviour advisors know best for solving equine behaviour problems.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. Equine behaviour advisors should teach owners how to understand their horses.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. Equine behaviour advisors base their work upon an understanding of horse psychology.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 2: What may help you, or prevent you, from following the equine behaviour advisor's advice.

We are interested in what you feel may limit, or improve, your own ability to follow an equine behaviour advisor's advice. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in section 1.

Beginning of questions

1. At present I often think about carrying out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. At present I am preparing to carry out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. At present I am in the process of carrying out the advice given to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. I have successfully been carrying out the advice given to me for some time.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. I am directly responsible for completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. I feel unsure that I can complete the programme of advice without continuous support.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. I feel there is social pressure not to use an equine behaviourist.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. I will follow the programme of advice even if others around me disapprove.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. I believe I may struggle to access the training facilities I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. I believe I may struggle to find the time I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. I believe I may struggle to find the money I need to complete the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. I worry that my horse won't respond to the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. The actions of other people will prevent me from completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 3: Your horse

During this section the term ***Behavioural Problem*** **refers to anything your horse does that causes you a problem. This can be any behaviour ridden or in the stable / field, and however large or small**. Please answer all questions honestly, and remember there are no 'right' or 'wrong' answers. If you feel your horse does not have any behavioural problems and you are struggling to answer questions 1-9, please jump to questions 10-13.

Please indicate how much you agree or disagree with the following statements by circling the appropriate number as in section 1and 2.

Beginning of questions

1. My horse's behavioural problem interferes with the activities (work) I'd like to do with my horse.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. My horse's behavioural problem is detrimental to its own well being.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. My horse's behavioural problem is detrimental to my well being and/or the well being of people around me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. The training facilities I have available have contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. Lack of time available to spend with my horse has contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. Lack of money available has contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. My horse was always destined to develop a behavioural problem because that is the way he/she is.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

8. The actions of other people have contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

9. My horse and I will benefit greatly from completing the programme of advice.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. By completing the programme of advice I am likely to minimise my horse's behavioural problem / minimise the possibility of my horse developing a behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. My own behaviour has contributed to the development of my horse's behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. Achieving an improvement in my horse's behaviour is of great value to me.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. Please answer EITHER a) OR b).

e. I feel that my horse is unlikely to develop a behavioural problem.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

f. I feel that my horse and I are susceptible to developing behavioural problems that are worse than we already have.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Thank You!

Information about You and Your Horse

(It is important that this section of the form is completed as it will help us to pair up your 2 questionnaires)

About Your Horse:

Name: ……..

Breed / Type: ……

Age in years: …….

Sex: Mare Gelding Stallion

Please describe briefly the nature of any behavioural problems you feel your horse displays. *(The term behavioural problem refers to any behaviour displayed by your horse that causes you a problem, when ridden or in the stable or field, however large or small).* Include details of whether you have addressed the problem and if so how.

About You:

Sex: M / F Age: under 20 / 21-30 / 31-40 / 41-50 / 51-60 /

61 or older

For how many years have you ridden / driven?

For how many years have you kept horses or ponies?

Would you describe yourself as a leisure rider / committed

amateur / professional?

Do you consider your horse skills to be novice / intermediate / advanced?

Appendix 2.6 Revised informative letter

Dear participant,

You are cordially invited to take part in a research study titled:

Advise on Equine Behaviour

What is the purpose of the research and why is it important?
Equine behaviour is a fast growing industry, but so far there has been little consideration of how effective practitioners are for horse owners. In this study I am aiming to;

- Establish whether horse owners seeking advice from an equine behaviour advisor benefit more from individual consultations, group demonstrations or workshops.
- We are also interested in which of the owners' characteristics determine how they benefit from the advice given to them.

By looking at these things we will be able to provide advice so when you or your friends use an equine behaviour advisor you are getting the best service possible!

If you own an equine, or are the carer of a particular equine, we would be much appreciative if I could have a small piece of your time.

What does taking part entail?
Taking part entails;

- Completing a short questionnaire before your consultation, workshop, or demonstration. The questionnaire should take no longer than 15minutes to complete.
- Complete a very similar questionnaire ten days after the consultation, workshop, or demonstration.
- Complete a final questionnaire around three months after.
- You can also opt to be contacted by telephone to give any anecdotes that you feel would be beneficial to the project. This is entirely optional.

If you decide to take part you are still free to withdraw at any time, and all the information you give will be confidential.

The Results and contacts for further information
The results of the study will be presented to the equine behaviour advisor taking part, and will be used in an MPhil thesis. If you would like a copy of the results you can obtain them from the named researchers late 2008. The results may also be published in academic journals similarly if you wish to have a copy you can ask us to send them when they are available.

If you have any questions, or wish for further information at anytime, you can contact the lead researchers Ruth Jobling and Dr Emma Creighton at the Department of Biology, University of Chester, Parkgate Road, Chester, CH1 4BJ. You may also contact Ruth or Emma by email on r.jobling@chester.ac.uk and e.creighton@chester.ac.uk Thank you for taking the time to read this and we look forward to your help with this research.

Appendix 3

Standard correspondences to invite participation from horse behaviour consultants and riding clubs

Appendix 3.1 Standard correspondence to horse behaviour consultants

Dear

I am writing to promote my academic research, and ask whether you would be interested in being involved with the project. The research is an exploratory investigation into services related to equine behaviour and welfare. The project aims to devise a model that determines what characteristics in horse owners seeking advice/information about their equines' behaviour, predict whether they adhere to the given advice/information. The results will provide valuable information to people practising in this industry, giving an insight into what barriers clients believe to be stopping them from following advice given. The research will also be a worthwhile contribution to equine science.

The project is now in the data collection stage. I am writing to ask if you would be at all interested in participating in the project as a professional offering advice, training, information and/or others such activities relating to equine behaviour and welfare. We are looking to survey clients seeking advice on an individual consultation basis, and clients attending workshops and demonstrations. Should you wish to help it would involve asking clients if they wish to participate and complete the survey - 'packs' would be provided and forwarded to yourself at your request. Alternatively where you feel appropriate I am eager to speak at demonstrations and workshops to introduce the project, and hand out questionnaires in person.

In return for your help you would be fully acknowledged for your involvement in the project in all subsequent publications and presentation of the work.

I hope you find the project interesting and are able to offer some help however modest as all is very much appreciated.

Thank you for taking the time to read this. I can be contacted by email or on [redacted].

Appendix 3.2 Standard correspondence to British Horse Society Riding Clubs

Dear ,

I am writing regarding some academic research being carried out by the Equine Welfare Research team at the University of Chester. The research is an exploratory investigation into services related to equine behaviour and welfare. The project aims to devise a model that determines what characteristics in horse owners seeking advice/information about equine behaviour, predict whether they are able to follow the advice/information given. The results will provide valuable information to people practising in this industry, giving an insight into what barriers clients believe are stopping them from following advice. The research is a much needed piece of work and will be a worthwhile contribution to equine science.

The project is now in the data collection stage. I am surveying clients, participants and attendees of a variation of activities relating to equine behaviour and welfare; such activities range from riding lessons where behaviour is in focus, individual consultations with behaviour consultants, small workshops and large scale demonstrations. I am contacting you with the hope that you are able to help us collect data for the project. The survey entails participants completing a questionnaire prior to, or at the start of the event/consultation, approximately ten days after, and finally around three months later. In the past I have supplied event organisers with packs to distribute to attendees that are interested in participating, however I can attend events to personally invite people to take part and distribute the questionnaires. The packs contain an invitation to take part in the research and information about the project, a consent form, the three questionnaires and SAE's for their return.

I am hoping that you feel you are able to help us collect data. The ……event on the …….. would be particularly relevant to the research, and would be an ideal opportunity to collect data if you agreed it was suitable. In return your self and ……. would be fully acknowledged in all subsequent publications of the research.

I will be collecting data until autumn so please do get in touch you if you feel you are able to help, as all contributions to this much needed piece of research are very

much appreciated!! Thank you for taking the time to read this. If you would like to discuss the project further please do contact me either by email at [redacted], or on [redacted]. I look forward to your reply.

Yours sincerely

Ruth Jobling

APPENDIX 4

Colinearity assessments

Appendix 4.1 Items of the cognitive variable *attitude towards horse behaviour consultants* correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 52*).*

	Item 1	*Item 2*	*Item 3*	*Item 4*	*Item 5*	*Item 6*	*Item 7*	*Item 8*	*Item 9*	*Item10*
Item 1		.277*	.286*	-.162	-.031	-.140	.011	.124	.078	.357**
Item 2	.277*		.398**	.027	-.182	-.184	.386**	.331*	.691**	.149
Item 3	.286*	.398**		.043	-.044	.052	.242	.729**	.306*	.209
Item 4	.162	.027	.043		.623**	-.196	.199	.017	.114	.604**
Item 5	.031	-.182	-.044	.623**		-.158	.267	-.064	-.139	.462**
Item 6	-.140	-.184	.052	-.196	-.158		-.079	.069	-.235	-.287**
Item 7	.011	.386**	.242	.199	.267	-.079		.301*	.385**	.448**
Item 8	.124	.331*	.729**	.017	-.064	.069	.301*		.384**	.155
Item 9	.078	.691**	.306*	.114	-.139	-.235	.385**	.384**		.219
Item 10	.357**	.149	.209	.604**	.462**	-.287*	.448*	.155	.291	

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

Appendix 4.2 Items of the cognitive variable extent *that external barriers will prevent adherence to the advice* correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 52)

	Item 1	*Item 2*	*Item 3*	*Item 4*	*Item 5*
Item 1		.680**	.646**	.335*	.270
Item 2	.680**		.479**	.377**	.351*
Item 3	.646**	.479**		.490**	.313*
Item 4	.335*	.377**	.490**		.478*
Item 5	.270	.331*	.313*	.478*	

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

Appendix 4.3 Items of the cognitive variable *perceived severity of the horse's behaviour problem* correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 52)

	Item 1	*Item 2*	*Item 3*
Item 1		.307*	.230
Item 2	.307*		.455**
Item 3	.230	.455**	

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

Appendix 4.4 Items of the cognitive variable attribution of the horse's behavioural problem to external factors correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 52).

	Item 1	*Item 2*	*Item 3*	*Item 4*	*Item 5*
Item 1		.658**	.502**	.132	-.103
Item 2	.658**		.584**	.199	.096
Item 3	.502**	.584**		.331*	.034
Item 4	-.132	.199	.331*		.125
Item 5	-.103	.096	.034	.125	

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

Appendix 4.5 The total scores of the cognitive variables correlated against each other using two-tailed Spearman's rank order correlation calculations (N = 52).

	Attitude towards horse behaviour consultants	*Extent that external barriers will prevent adherence to the advice*	*Self-efficacy of adhering to the advice*	*Subjec-tive norms*	*Perceived severity of the horse's behaviour problem*	*Attribution of the horse's behaviour problem to external factors*	*Attribution of the horse's behaviour problem to own behaviour*	*Perceived benefit of adhering to the advice*	*Value of the outcome of adhering to the advice*	*Perceived susceptibility of the horse developing a behaviour problem*
Attitude towards horse behaviour consultants		-.141	-.213	-.191	.250	-.085	-.164	.251	.252	-.052
Extent that external barriers will prevent adherence to the advice	-.141		-.348*	.305*	.141	.378**	-.071	-.049	-.137	.175
Self-efficacy of adhering to the advice	-.213	-.348*		-.328*	-.175	-.099	-.006	-.096	.036	-.264
Subjective norms	-.191	.305*	-.328*		-.095	.190	-.043	-.073	-.064	-.092
Perceived severity of the horse's behaviour problem	.250	.141*	-.175	-.103		.281*	.071	.324*	.452**	.187
Attribution of the horse's behaviour problem to external factors	-.085	.416**	-.118	.190	.281*		-.072	-.030	-.046	.161

Attribution of the horse's behaviour problem to own behaviour	-.164	-.071	-.066	-.043	-.071	-.072		-.016	-.015	.190
Perceived benefit of adhering to the advice	.251	-.049	-.096	-.073	.324*	-.030	-.016		.410**	-.010
Value of the outcome of adhering to the advice	.252	-.137	.036	-.064	.452**	-.027	-.015	.410**		.237
Perceived susceptibility of the horse developing a behaviour problem	.052	.175	-.264	-.092	.187	.161	.190	-.010	.237	

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

APPENDIX 5

Statistical outputs of analyses conducted to establish the research aims

Appendix 5.1 ANOVA to assess the effect of owner gender on adherence

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Adherencesum	Between Groups	1.255	1	1.255	.077	.783
	Within Groups	588.324	36	16.342		
	Total	589.579	37			
FAdherencesum	Between Groups	71.906	1	71.906	2.848	.101
	Within Groups	858.400	34	25.247		
	Total	930.306	35			

Appendix 5.2 ANOVA to assess the effect of owner age on adherence

Descriptives

Adherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Under 20	3	22.0000	5.29150	3.05505	8.8552	35.1448	16.00	26.00
21-30	3	22.6667	1.15470	.66667	19.7982	25.5351	22.00	24.00
31-40	10	21.0000	4.21637	1.33333	17.9838	24.0162	16.00	28.00
41-50	14	19.7143	3.85164	1.02940	17.4904	21.9382	13.00	28.00
51-60	7	22.1429	5.08031	1.92018	17.4444	26.8414	15.00	28.00
61 and over	1	20.0000	.	.	.	.	20.00	20.00
Total	38	20.9211	4.06289	.65909	19.5856	22.2565	13.00	28.00

Test of Homogeneity of Variances

Adherencesum

Levene Statistic	df1	df2	Sig.
1.512(a)	4	32	.222

a Groups with only one case are ignored in computing the test of homogeneity of variance for Adherencesum.

ANOVA

Adherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.382	5	8.876	.502	.773
Within Groups	566.381	32	17.699		
Total	610.763	37			

Descriptives

FAdherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Under 20	3	22.3333	4.61880	2.66667	10.8596	33.8071	17.00	25.00
21-30	3	18.3333	1.52753	.88192	14.5388	22.1279	17.00	20.00
31-40	11	19.0909	6.67015	2.01113	14.6098	23.5720	7.00	28.00
41-50	16	20.0625	4.37369	1.09342	17.7319	22.3931	13.00	28.00
51-60	3	19.0000	6.55744	3.78594	2.7104	35.2896	12.00	25.00
61 and over	1	13.0000	.	.	.	.	13.00	13.00
Total	37	19.5405	5.11856	.84149	17.8339	21.2472	7.00	28.00

Test of Homogeneity of Variances

FAdherencesum

Levene Statistic	df1	df2	Sig.
1.980(a)	4	31	.122

a Groups with only one case are ignored in computing the test of homogeneity of variance for FAdherencesum.

ANOVA

FAdherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	78.009	5	15.602	.559	.730
Within Groups	865.180	31	27.909		
Total	943.189	36			

Appendix 5.3 ANOVA to assess the effect of rider type on adherence

Descriptives

Adherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Leisure Rider	20	20.8000	4.12438	.92224	18.8697	22.7303	13.00	28.00
Committed Amateur	18	21.2778	4.09886	.96611	19.2395	23.3161	16.00	28.00
Professional	1	19.0000	.	.	.	.	19.00	19.00
Total	39	20.9744	4.02288	.64418	19.6703	22.2784	13.00	28.00

Test of Homogeneity of Variances

Adherencesum

Levene Statistic	df1	df2	Sig.
.027(a)	1	36	.870

a Groups with only one case are ignored in computing the test of homogeneity of variance for Adherencesum.

ANOVA

Adherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.163	2	3.082	.182	.834
Within Groups	608.811	36	16.911		
Total	614.974	38			

Descriptives

FAdherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Leisure Rider	13	19.3846	5.67947	1.57520	15.9525	22.8167	12.00	28.00
Committed Amature	22	19.5909	5.10517	1.08843	17.3274	21.8544	7.00	28.00
Professional	2	20.0000	2.82843	2.00000	-5.4124	45.4124	18.00	22.00
Total	37	19.5405	5.11856	.84149	17.8339	21.2472	7.00	28.00

Test of Homogeneity of Variances

FAdherencesum

Levene Statistic	df1	df2	Sig.
1.296	2	34	.287

ANOVA

FAdherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.794	2	.397	.014	.986
Within Groups	942.395	34	27.718		
Total	943.189	36			

Appendix 5.4 ANOVA to assess the effect of rider's level of skill on adherence

Descriptives

Adherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Novice	5	20.2000	7.25948	3.24654	11.1862	29.2138	13.00	28.00
Intermediate	29	21.1034	3.50861	.65153	19.7688	22.4381	16.00	28.00
Advanced	5	21.0000	3.74166	1.67332	16.3541	25.6459	16.00	26.00
Total	39	20.9744	4.02288	.64418	19.6703	22.2784	13.00	28.00

Test of Homogeneity of Variances

Adherencesum

Levene Statistic	df1	df2	Sig.
6.716	2	36	.003

ANOVA

Adherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.485	2	1.742	.103	.903
Within Groups	611.490	36	16.986		
Total	614.974	38			

Descriptives

FAdherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Novice	8	18.5000	5.50325	1.94569	13.8992	23.1008	12.00	28.00
Intermediate	25	19.4800	5.17301	1.03460	17.3447	21.6153	7.00	28.00
Advanced	4	22.0000	4.32049	2.16025	15.1251	28.8749	18.00	28.00
Total	37	19.5405	5.11856	.84149	17.8339	21.2472	7.00	28.00

Test of Homogeneity of Variances

FAdherencesum

Levene Statistic	df1	df2	Sig.
.263	2	34	.770

ANOVA

FAdherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.949	2	16.475	.615	.546
Within Groups	910.240	34	26.772		
Total	943.189	36			

Appendix 5.5 ANOVA to assess the effect of the type of communication on adherence

Adherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
One to one consultation	9	20.6667	3.96863	1.32288	17.6161	23.7172	16.00	28.00
Workshop	22	21.4091	3.99594	.85194	19.6374	23.1808	15.00	28.00
Demonstration	6	18.8333	4.75044	1.93936	13.8481	23.8186	13.00	26.00
Total	37	20.8108	4.10175	.67432	19.4432	22.1784	13.00	28.00

Test of Homogeneity of Variances

Adherencesum

Levene Statistic	df1	df2	Sig.
.189	2	34	.829

ANOVA

Adherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.524	2	15.762	.933	.403
Within Groups	574.152	34	16.887		
Total	605.676	36			

Descriptives

FAdherencesum

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
One to one consultation	12	20.9167	5.66422	1.63512	17.3178	24.5155	7.00	28.00
Workshop	19	19.4737	5.18940	1.19053	16.9725	21.9749	12.00	28.00
Demonstration	6	17.0000	2.96648	1.21106	13.8869	20.1131	13.00	22.00
Total	37	19.5405	5.11856	.84149	17.8339	21.2472	7.00	28.00

Test of Homogeneity of Variances

FAdherencesum

Levene Statistic	df1	df2	Sig.
1.516	2	34	.234

ANOVA

FAdherencesum

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	61.536	2	30.768	1.187	.318
Within Groups	881.654	34	25.931		
Total	943.189	36			

Appendix 5.6 Correlation analyses of pre-communication measures of the cognitive variables and adherence ten days after the communication and three months after the consultation.

Correlations

			Attitudesum	Subweighted	Value	Adherencesum	FAdherencesum
Spearman's rho	Attitudesum	Correlation Coefficient	1.000	-.209	.252*	.292*	.110
		Sig. (1-tailed)	.	.071	.036	.034	.258
		N	52	51	52	40	37
	Subweighted	Correlation Coefficient	-.209	1.000	-.069	.043	-.042
		Sig. (1-tailed)	.071	.	.315	.396	.404
		N	51	51	51	39	36
	Value	Correlation Coefficient	.252*	-.069	1.000	-.054	.220
		Sig. (1-tailed)	.036	.315	.	.371	.095
		N	52	51	52	40	37
	Adherencesum	Correlation Coefficient	.292*	.043	-.054	1.000	.102
		Sig. (1-tailed)	.034	.396	.371	.	.311
		N	40	39	40	40	26
	FAdherencesum	Correlation Coefficient	.110	-.042	.220	.102	1.000
		Sig. (1-tailed)	.258	.404	.095	.311	.
		N	37	36	37	26	37

*. Correlation is significant at the 0.05 level (1-tailed).

Correlations

		ExternalsumLog	InternalsumLog	AttributionsumLog	BenefitsumLog	SusceptibilityLog	AdherenceLog	FAdherencesumLog
ExternalsumLog	Pearson Correlation	1	-.298*	.340**	-.031	.111	-.097	-.247
	Sig. (1-tailed)		.017	.008	.416	.225	.279	.073
	N	51	51	50	50	49	39	36
InternalsumLog	Pearson Correlation	-.298*	1	-.150	-.153	-.262*	-.040	.012
	Sig. (1-tailed)	.017		.149	.145	.035	.405	.473
	N	51	51	50	50	49	39	36
AttributionsumLog	Pearson Correlation	.340**	-.150	1	-.118	.155	-.290*	.114
	Sig. (1-tailed)	.008	.149		.208	.144	.037	.254
	N	50	50	51	50	49	39	36
BenefitsumLog	Pearson Correlation	-.031	-.153	-.118	1	.048	.049	.289*
	Sig. (1-tailed)	.416	.145	.208		.370	.381	.044
	N	50	50	50	51	50	40	36
SusceptibilityLog	Pearson Correlation	.111	-.262*	.155	.048	1	-.150	-.190
	Sig. (1-tailed)	.225	.035	.144	.370		.178	.138
	N	49	49	49	50	50	40	35
AdherenceLog	Pearson Correlation	-.097	-.040	-.290*	.049	-.150	1	.099
	Sig. (1-tailed)	.279	.405	.037	.381	.178		.316
	N	39	39	39	40	40	40	26
FAdherencesumLog	Pearson Correlation	-.247	.012	.114	.289*	-.190	.099	1
	Sig. (1-tailed)	.073	.473	.254	.044	.138	.316	
	N	36	36	36	36	35	26	37

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Correlations

		Severitysum	Adherencesum	FAdherencesum
Severitysum	Pearson Correlation	1	-.148	.007
	Sig. (1-tailed)		.181	.483
	N	52	40	37
Adherencesum	Pearson Correlation	-.148	1	.096
	Sig. (1-tailed)	.181		.320
	N	40	40	26
FAdherencesum	Pearson Correlation	.007	.096	1
	Sig. (1-tailed)	.483	.320	
	N	37	26	37

** Correlation significant at the 0.01 level
* Correlation significant at the 0.05 level

Correlations

		Adherencesum	AttributionOthersLog	AttributionSelf	AdherenceLog	FAdherencesumLog
Adherencesum	Pearson Correlation	1	-.315*	.013	.995**	.100
	Sig. (1-tailed)		.025	.469	.000	.313
	N	40	39	39	40	26
AttributionOthersLog	Pearson Correlation	-.315*	1	.079	-.316*	.100
	Sig. (1-tailed)	.025		.292	.025	.281
	N	39	50	50	39	36
AttributionSelf	Pearson Correlation	.013	.079	1	.021	.058
	Sig. (1-tailed)	.469	.292		.450	.369
	N	39	50	51	39	36
AdherenceLog	Pearson Correlation	.995**	-.316*	.021	1	.099
	Sig. (1-tailed)	.000	.025	.450		.316
	N	40	39	39	40	26
FAdherencesumLog	Pearson Correlation	.100	.100	.058	.099	1
	Sig. (1-tailed)	.313	.281	.369	.316	
	N	26	36	36	26	37

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Appendix 5.7 Correlation analyses of the amount of change in the cognitive variables and adherence ten days after the communication and three months after the consultation.

Correlations

		Adherencesum	FAdherencesum	AttitudeChangeF	AttitudeChange1wk	ExternalChange1wk	ExternalChangeF	InternalChange1wk	InternalChangeF	BenefitChange1wk	BenefitChangeF	SuscepChangeF
Adherencesum	Pearson Correlation	1	.096	-.150	-.023	.072	.204	.270	-.135	.222	.303	.254
	Sig. (2-tailed)		.641	.473	.888	.662	.328	.096	.521	.175	.133	.202
	N	40	26	25	40	39	25	39	25	39	26	27
FAdherencesum	Pearson Correlation	.096	1	.389(*)	-.057	.309	.258	-.181	-.149	-.185	.039	.297
	Sig. (2-tailed)	.641		.019	.780	.132	.129	.386	.386	.376	.819	.083
	N	26	37	36	26	25	36	25	36	25	36	35
AttitudeChangeF	Pearson Correlation	-.150	.389(*)	1	.376	.035	-.048	-.105	.057	-.094	.088	.174
	Sig. (2-tailed)	.473	.019		.064	.871	.783	.625	.746	.661	.615	.325
	N	25	36	36	25	24	35	24	35	24	35	34
AttitudeChange1wk	Pearson Correlation	-.023	-.057	.376	1	.028	-.275	.064	-.012	.110	.134	-.164
	Sig. (2-tailed)	.888	.780	.064		.867	.183	.700	.953	.504	.515	.414
	N	40	26	25	40	39	25	39	25	39	26	27
ExternalChange1wk	Pearson Correlation	.072	.309	.035	.028	1	.617(**)	-.294	-.297	.243	.094	.182
	Sig. (2-tailed)	.662	.132	.871	.867		.001	.069	.149	.142	.653	.373
	N	39	25	24	39	39	25	39	25	38	25	26
ExternalChangeF	Pearson Correlation	.204	.258	-.048	-.275	.617(**)	1	-.092	-.532(**)	.211	.113	.187
	Sig. (2-tailed)	.328	.129	.783	.183	.001		.662	.001	.321	.520	.290

	N	25	36	35	25	25	36	25	36	24	35	34
InternalChange1wk	Pearson Correlation	.270	-.181	-.105	.064	-.294	-.092	1	.146	.234	.005	.063
	Sig. (2-tailed)	.096	.386	.625	.700	.069	.662		.486	.158	.983	.761
	N	39	25	24	39	39	25	39	25	38	25	26
InternalChangeF	Pearson Correlation	-.135	-.149	.057	-.012	-.297	-.532(**)	.146	1	-.360	-.047	.041
	Sig. (2-tailed)	.521	.386	.746	.953	.149	.001	.486		.084	.787	.820
	N	25	36	35	25	25	36	25	36	24	35	34
BenefitChange1wk	Pearson Correlation	.222	-.185	-.094	.110	.243	.211	.234	-.360	1	.578(**)	-.052
	Sig. (2-tailed)	.175	.376	.661	.504	.142	.321	.158	.084		.003	.801
	N	39	25	24	39	38	24	38	24	39	25	26
BenefitChangeF	Pearson Correlation	.303	.039	.088	.134	.094	.113	.005	-.047	.578(**)	1	.056
	Sig. (2-tailed)	.133	.819	.615	.515	.653	.520	.983	.787	.003		.751
	N	26	36	35	26	25	35	25	35	25	36	35
SuscepChangeF	Pearson Correlation	.254	.297	.174	-.164	.182	.187	.063	.041	-.052	.056	1
	Sig. (2-tailed)	.202	.083	.325	.414	.373	.290	.761	.820	.801	.751	
	N	27	35	34	27	26	34	26	34	26	35	36

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			Adherencesum	FAdherencesum	ValueChange1wk	ValueChangeF
Spearman's rho	Adherencesum	Correlation Coefficient	1.000	.102	.437(**)	.037
		Sig. (2-tailed)	.	.621	.005	.854
		N	40	26	39	27
	FAdherencesum	Correlation Coefficient	.102	1.000	.279	-.023
		Sig. (2-tailed)	.621	.	.178	.896
		N	26	37	25	36
	ValueChange1wk	Correlation Coefficient	.437(**)	.279	1.000	-.021
		Sig. (2-tailed)	.005	.178	.	.917
		N	39	25	39	26
	ValueChangeF	Correlation Coefficient	.037	-.023	-.021	1.000
		Sig. (2-tailed)	.854	.896	.917	.
		N	27	36	26	37

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			Adherencesum	FAdherencesum	SubChange1wk	SubChangeF	SeverityChangeF	SuscepChange1wk
Spearman's rho	Adherencesum	Correlation Coefficient	1.000	.102	-.270	-.113	.055	-.191
		Sig. (2-tailed)	.	.621	.096	.584	.796	.238
		N	40	26	39	26	25	40
	FAdherencesum	Correlation Coefficient	.102	1.000	.271	.105	.172	-.148
		Sig. (2-tailed)	.621	.	.190	.541	.324	.471
		N	26	37	25	36	35	26
	SubChange1wk	Correlation Coefficient	-.270	.271	1.000	-.004	.073	.201
		Sig. (2-tailed)	.096	.190	.	.984	.733	.219
		N	39	25	39	26	24	39
	SubChangeF	Correlation Coefficient	-.113	.105	-.004	1.000	.064	-.277
		Sig. (2-tailed)	.584	.541	.984	.	.719	.170
		N	26	36	26	37	34	26
	SeverityChangeF	Correlation Coefficient	.055	.172	.073	.064	1.000	-.105
		Sig. (2-tailed)	.796	.324	.733	.719	.	.616
		N	25	35	24	34	35	25
	SuscepChange1wk	Correlation Coefficient	-.191	-.148	.201	-.277	-.105	1.000
		Sig. (2-tailed)	.238	.471	.219	.170	.616	.
		N	40	26	39	26	25	40

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Correlations

		FAdherencesum	Adherencesum	AttributionOthersChangeF	AttributionOthersChange1wk	AttributionSelfChange1wk
FAdherencesum	Pearson Correlation	1	.096	.290	.089	.251
	Sig. (2-tailed)		.641	.097	.681	.226
	N	37	26	34	24	25
Adherencesum	Pearson Correlation	.096	1	.535(**)	.418(**)	-.066
	Sig. (2-tailed)	.641		.005	.009	.689
	N	26	40	26	38	39
AttributionOthersChangeF	Pearson Correlation	.290	.535(**)	1	.663(**)	-.091
	Sig. (2-tailed)	.097	.005		.000	.659
	N	34	26	35	25	26
AttributionOthersChange1wk	Pearson Correlation	.089	.418(**)	.663(**)	1	-.183
	Sig. (2-tailed)	.681	.009	.000		.272
	N	24	38	25	38	38
AttributionSelfChange1wk	Pearson Correlation	.251	-.066	-.091	-.183	1
	Sig. (2-tailed)	.226	.689	.659	.272	
	N	25	39	26	38	39

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

			AttributionSelfChangeF	FAdherencesum
Spearman's rho	AttributionSelfChangeF	Correlation Coefficient	1.000	.257
		Sig. (2-tailed)	.	.136
		N	36	35
	FAdherencesum	Correlation Coefficient	.257	1.000
		Sig. (2-tailed)	.136	.
		N	35	37

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Appendix 5.8 Multiple regression analyses.

Model Summary(c)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.526(a)	.277	.236	3.47453	.277	6.700	2	35	.003	
2	.531(b)	.282	.218	3.51369	.005	.224	1	34	.639	2.481

a Predictors: (Constant), AttributionOthersChange1wk, ValueChange1wk
b Predictors: (Constant), AttributionOthersChange1wk, ValueChange1wk, ValueC1wkAttriC1wk
c Dependent Variable: Adherencesum

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	161.782	2	80.891	6.700	.003(a)
	Residual	422.534	35	12.072		
	Total	584.315	37			
2	Regression	164.550	3	54.850	4.443	.010(b)
	Residual	419.766	34	12.346		
	Total	584.315	37			

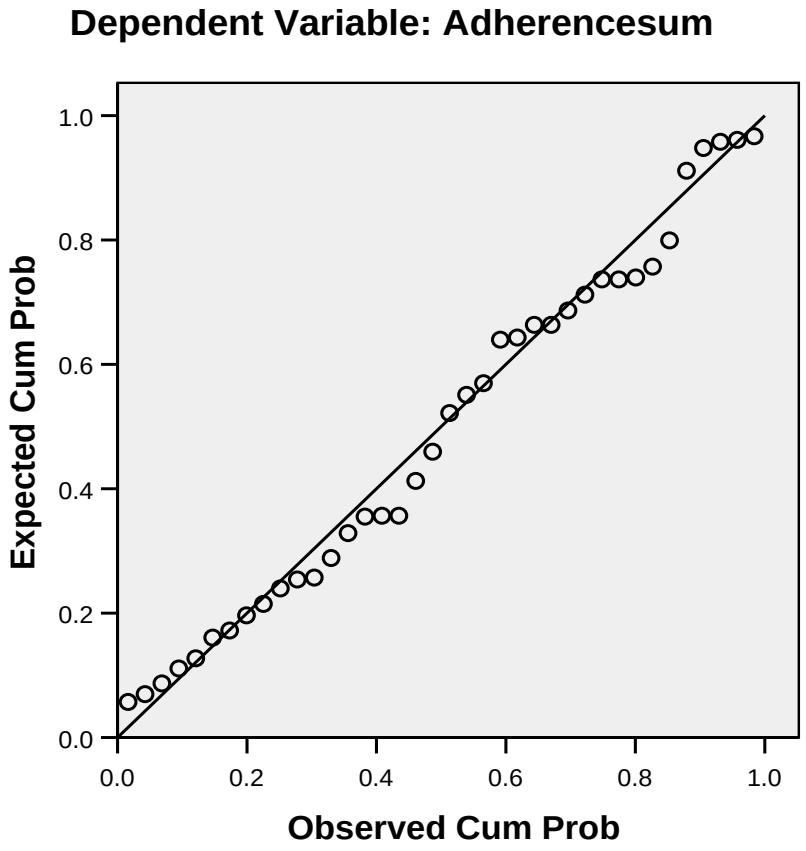
a Predictors: (Constant), AttributionOthersChange1wk, ValueChange1wk
b Predictors: (Constant), AttributionOthersChange1wk, ValueChange1wk, ValueC1wkAttriC1wk
c Dependent Variable: Adherencesum

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	21.346	.646		33.041	.000	20.035	22.658					
	ValueChange1wk	3.406	1.533	.338	2.222	.033	.294	6.519	.438	.352	.319	.894	1.118
	AttributionOthersChange1wk	.249	.123	.309	2.030	.050	.000	.499	.418	.325	.292	.894	1.118
2	(Constant)	21.292	.663		32.103	.000	19.944	22.640					
	ValueChange1wk	3.760	1.721	.373	2.185	.036	.262	7.257	.438	.351	.318	.726	1.378
	AttributionOthersChange1wk	.258	.126	.319	2.055	.048	.003	.514	.418	.332	.299	.875	1.143
	ValueC1wkAttriC1wk	.115	.243	.080	.474	.639	-.378	.608	-.190	.081	.069	.748	1.336

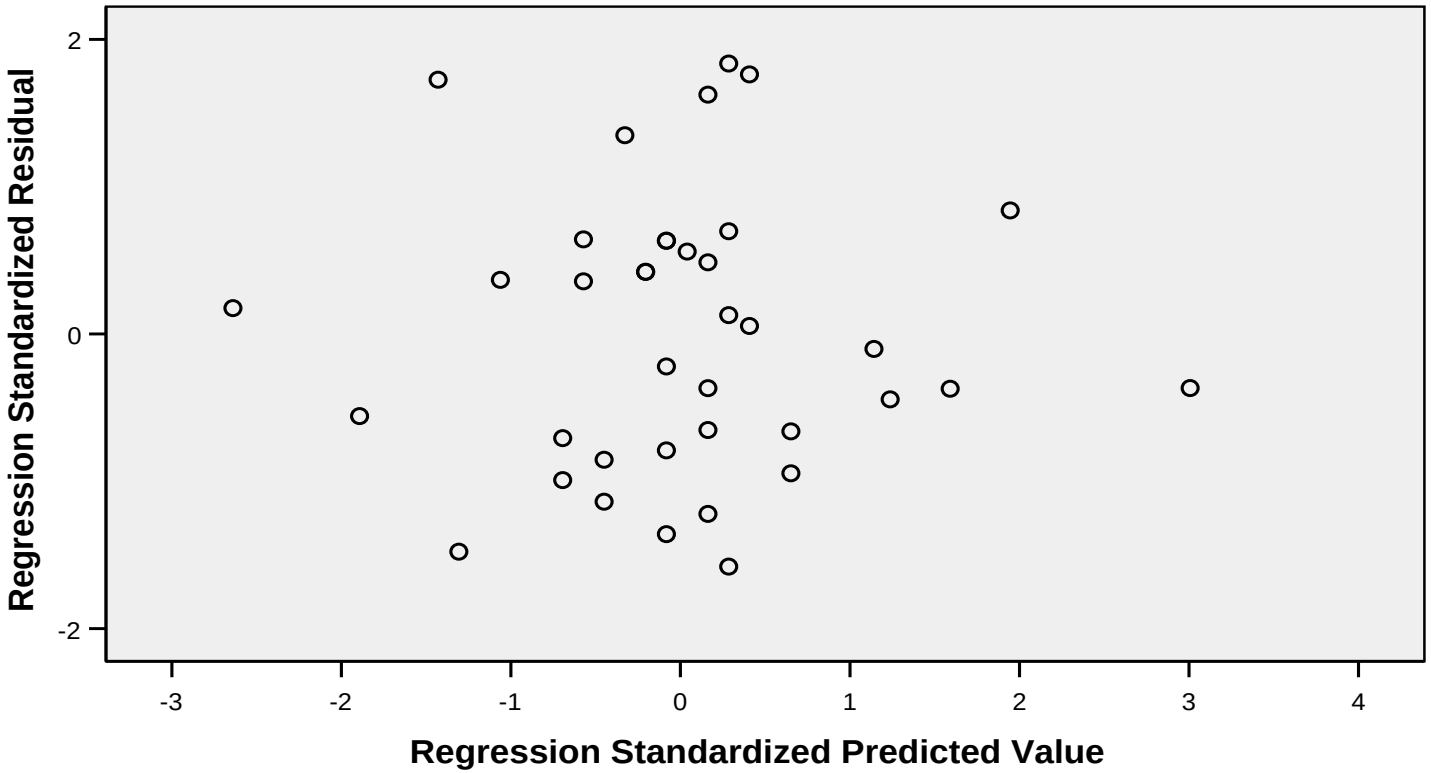
a Dependent Variable: Adherencesum

Normal P-P Plot of Regression Standardized Residual



Scatterplot

Dependent Variable: Adherencesum



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